FOUNDRY TRADE JOURNAL

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A Happy Inauguration

That coincidences can be a nuisance has been well illustrated by a duplication of effort when Mr. Wetherall and ourselves, both having for several years deemed it desirable to create a co-operative organization for patternmakers, decided to propagate the matter at the same time. There was, however, a difference in the aspirations of the two projected schemes; Mr. Wetherall desired as one of the main objects of such an association the negotiation of wages and working conditions of the craftsmen, whereas we deemed this to be undesirable. At a public meeting of patternmakers held last Wednesday in Birmingham, Mr. Wetherall, who has been to considerable trouble and expense to organize an association, withdrew from amongst its aspirations the clauses germane to labour negotiations. A strong steering committee was formed at the meeting to proceed with formulation of "articles of association," the appointment of secretaries and the hundred and one other things necessary to establish the proposed organization. Mr. B. Levy is to be the convener for this committee, also, a recognition of the sterling work he has already undertaken.

The time is indeed ripe for the launching of a master-patternmakers' association because of their ever-increasing importance to the foundry industry, and thereby emulating American conditions. The finish and complexity of many patterns demand for their making the use of machinery, which it would not be economic to install in any but the largest of foundry concerns. As the importance of the pattern-making service to the foundry grows, so, too, does knowledge of the requirements of their customers increase. Yet there is room for still further expansion of this knowledge, as more and more work is transferred from the tied works to the master-patternmakers' shops. Already, there is a vast accumulation of data in these shops of the technique of making patterns for the shell-moulding process.

It is always advisable, when starting anything fresh, to take stock of existing facilities. So far as a technical forum for patternmaking is concerned, the trade is well catered for by the Institute of British Foundrymen, and its *Proceedings* could not be improved upon as a permanent record of new processes, techniques and developments. For wages and labour conditions among the patternmakers, there is the Engineering and Allied Employers' Association which has a vast experience and will no doubt be receptive to views expressed by any well-established group of master-patternmakers. This leaves the body now being formed the task of organizing itself so as to undertake social, trade, educational, and all the other activities regularly carried out by employers' associations. For instance, at the present time there is a committee investigating skin diseases and respiratory troubles caused, it is thought, by the use of oriental hard-woods; this would seem to come well within the purview of the proposed association. We wish the neophyte organization every success in its laudable endeavours to raise the status of master patternmakers to the level achieved by other constituents of our industry.

Correspondence

ELEMENTS OF FOUNDRY COSTING—PARTS II & III

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—It is possible that the review in your issue of January 28 last of the above publications will discourage some foundrymen from "extracting what can be best applied to their current production."

Your reviewer refers to weighing at several points in the sequence of operation. The "grossing" method (which involves no more weighing operations than are normal practice in any reasonably well managed foundry) is not described as a "poor alternative" by the authors; they merely point out that it is perhaps not so reliable as the other methods elaborated.

Your reviewer also comments upon the policy of ascertaining the cost of metal at the spout, and of valuing home scrap at ingredient cost. These principles were drafted by a representative committee of foundry managers and works accountants and were embodied in "Cost Ascertainment Methods for the Ironfounding Industry," published by the Council of Ironfoundry Associations in 1947, as pointed out in Part I of this series of articles. They have been written particularly from the point of view of the small foundryman in the hope that he will adopt such of the recommended practices as he is immediately able to apply, and that with further experience he will try to improve the accuracy of his methods.—Yours faithfully,

S. H. RUSSELL,
Chairman, Development Panel,
Council of Ironfoundry Associations.

14, Pall Mall, London, S.W.1.

Merchandise Marks Act*

The Board of Trade draws the attention of industry to Section 1 of the Merchandise Marks Act, 1953. The whole of this Act which strengthens the laws relating to merchandise marks and increases the penalties for offences, came into operation on February 1. Under the Acts (1887 to 1953) it is now an offence to apply a false or misleading trade description to goods or to sell goods to which a false or misleading trade description is applied. "Trade description" will mean any description, statement, or other indication, direct or indirect (1) as to the number, quantity, measure, gauge or weight of any goods; (1*a*) as to the standard of quality of any goods according to a classification commonly used or recognized in the trade; (1*b*) as to the fitness for purpose, strength, performance or behaviour of any goods; (2) as to the place or country in which any goods were made or produced; (3) as to the mode of manufacturing or producing any goods; (4) as to the material of which any goods are composed, and (5) as to any goods being the subject of an existing Patent, privilege or copyright.

* The important clauses of this Act were detailed in an article appearing on page 696 of the JOURNAL, December 3, 1953.

UNDER a new trade agreement signed between Belgium and Russia, Russia will deliver ferro-manganese ore, chromium ore, gas oils, anthracite, tar, asbestos, cast iron, and other goods. Belgian exports to Russia will include supplies of lead, and between 1954 and 1957, 10 cargo vessels, 10 cold-storage ships, floating cranes, floating pile drivers, and boilers.

Master Patternmakers' Association

About 50 master patternmakers from as far apart as London and Darlington attended a meeting in the Queen's Hotel, Birmingham, on Wednesday of last week to decide upon the feasibility of forming a British master patternmakers' association. Initially, Mr. V. C. Faulkner was asked to take the chair and the meeting was then opened for general discussion. During the proceedings, two important resolutions were passed:—

(1) The meeting approved of the suggestion that it was desirable to form a national master patternmakers' association to deal with general commercial matters, but which did not accept responsibility for wages and working conditions.

(2) A committee shall be formed to draw up the constitution for an organization which will further the objects referred to in resolution (1).

In furtherance of the second resolution, it was resolved that Mr. Levy be asked to act as convener to the first meeting of a committee meeting which is to be held on Wednesday, March 3, at the Queen's Hotel, Birmingham, at 12.30 p.m. for 1 p.m. Luncheon will precede the meeting. Master patternmakers interested in subsequent arrangements concerning the association are invited to communicate direct with Mr. B. Levy, 3 to 5 Osbert Street, London, S.W.1.

Dinner

WORSHIPFUL COMPANY OF FOUNDERS

The annual Livery Dinner of the Company was held at the Grocers' Hall last Monday. The Master, Dr. Hugh S. Stannus, presided, and the chief guests were the Lord Mayor of London (Sir Noël Vansittart Bowater, Bt.) and Sheriffs (Alderman E. V. M. Stockdale and Mr. Norman C. Tremellen). At the high table were Sir Russell Brain; Sir Eric St. John Bamford; Mr. J. D. Christopher; Rear Admiral C. F. Harris; Surgeon Rear Admiral Sir John Gordon-Taylor; Viscount Long of Wraxall; Dr. H. Seaward Morley; the Rev. G. H. Salter; Mr. W. Stovin Bradford; Professor F. C. Thompson; Mr. A. S. Young; Sir Leslie Brass; Mr. A. L. Parrott; Mr. Percy L. Young (past-Master); Mr. Geoffrey K. D. Pontifex; Mr. Frederick C. Lane; Mr. George Spencer; Mr. E. Longden; Mr. Kenneth H. Adams (immediate past-Master); Col. C. W. G. Walker; Col. R. G. Lawrence; Mr. D. S. Young (past-Master); Mr. Harry Hughes (past-Master); Mr. S. G. L. Lawrence; Mr. Lionel Atherton; Brigadier T. E. M. Battersby; Mr. L. D. Helder; Mr. W. G. Fossick (past-Master); Mr. G. W. Ilsley (Upper Warden); Mr. G. B. Parker; Sir Edward Ritson; Mr. A. C. Jennings (Under Warden); Mr. E. G. Roberts; Mr. J. J. Eades, and Mr. D. C. C. Roberts. Past-Masters heading the branch tables were Mr. G. B. Cotton; Mr. A. P. L. Blaxter; Mr. J. Arthur Taylor; Mr. L. H. Corbould Ellis, and Mr. J. L. Wheeler, with the Clerk, Mr. H. Wilson Wiley, at the central one.

Amongst the guests of the Company or the Liverymen were Mr. C. L. Bettinson; Mr. T. Makemson; Mr. R. T. Redfern; Mr. G. R. Webster; Mr. Frank Webster, and Mr. R. Handley.

Latest Foundry Statistics.—According to the British Bureau of Non-Ferrous Metal Statistics the output of copper-base castings in 1953 was 50,093 tons as against 66,306 tons in 1952. The December production was, at 4,791 tons, running higher than the monthly average.

Quantity Production of Engineering Castings*

By J. Burrell

Prior to 1944, *most of the work being done in the Author's foundry was of a jobbing and semi-jobbing nature. The foundry, amongst other things, manufactures on a fairly large scale castings for agricultural and road-making machinery, and although production of certain peace-time products had been continued during the war years, considerable "re-casting" of production programmes was felt necessary to meet the expected heavy peace-time demands. A considerable increase in tractor production was envisaged with a consequent demand for castings of a specialized nature in large quantities.*

The Author well remembers visiting the pattern shop on the first day of his arrival at the works and being shown a full-scale wooden model of a tractor and told that production of castings for thousands of this type of tractor would be his particular "headache" for some time to come. He little realized how big the headache would be until he had had time to assess the production potential of the foundry against the envisaged increase in production of tractor and other agricultural machines.

* Paper presented to the Lincolnshire branch of the Institute of British Foundrymen. Mr. Killingworth presiding. The Author for the last nine years has been in charge of the foundry of Marshall Sons & Company, Limited, Gainsborough.

FIG. 1.—*General layout of the reorganized foundry of Marshall Sons & Company, Limited.*

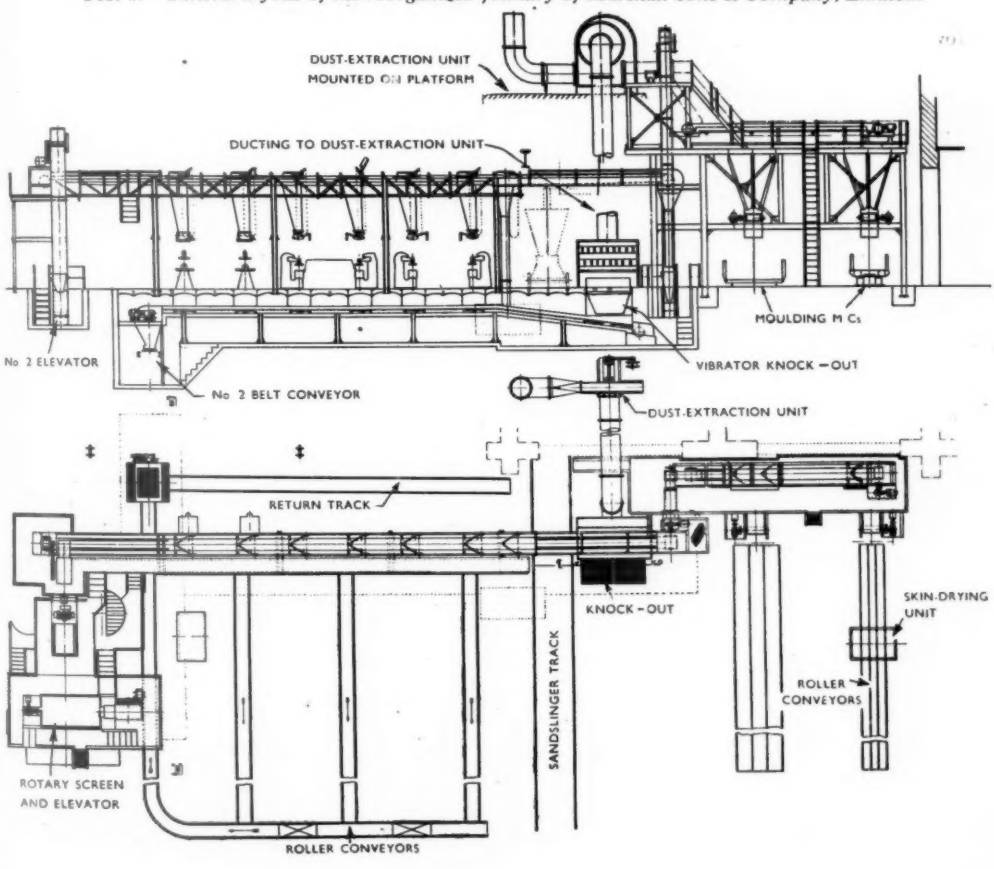

FIG. 2.—*Battery of moulding machines with overhead sand supply and the roller conveyor servicing them; and (in the background) the sand-preparation plant.*

The problem was not so much one of a necessity for increased tonnage so much as an increase in numbers of castings. In some instances, production had to be increased 25 times and as most of these castings were of a medium-heavy nature and at that time made by hand moulding methods, it was obvious that drastic modifications would have to be made to plant and methods of production.

Most of the work at this time being of a jobbing and semi-jobbing nature, and although the shop was fairly well equipped for this type of work, it was obviously unsuitable for quantity production. Although several small moulding machines of the "pin-lift" type were located in various areas of the shop and one 1,500 lb. "roll-over" type machine had been installed, these were all hand fed, and all heavy type tractor castings were being hand moulded.

After careful consideration of future casting requirements and in view of the wide range of products manufactured by the company, it was decided to utilize the existing moulding machines in addition to purchasing several new machines and to embody these together with a composite sand plant into a semi-mechanized moulding unit.

The object of this Paper is to describe this plant and by selecting several typical castings produced from it to illustrate the methods of production adopted. It is stressed that this is not a description of the activities of a mass-production foundry, but rather that of a quantity production unit producing castings in widely varying batch amounts involving frequent pattern changes.

It should be appreciated that during the planning of the necessary modifications to plant layout, the jobbing side of the business (which is fairly considerable) had to be taken into account. The foundry is thus, in effect, a semi-jobbing shop into which a batch production unit has been incorporated.

FIG. 3.—*Light moulding and casting bay; long roller-conveyor tracks and monorail-suspended pouring ladles are installed. The track in the foreground leads to the knock-out.*

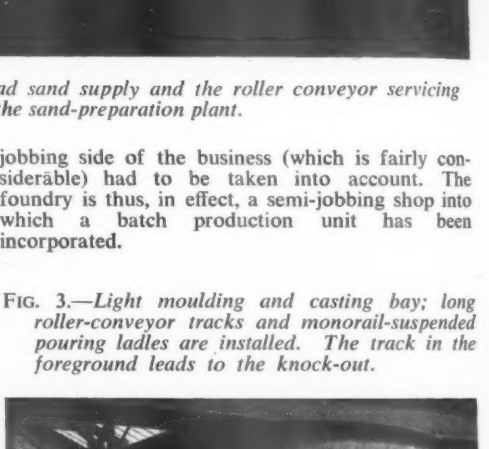

FIG. 4.—*Heavy and medium section, showing moulding machines, feed hoppers, roller-conveyor tracks, skin-drying unit and knock-out (rear, left).*

Mould Production

The plant which was eventually installed for mould production is illustrated in Figs. 1 to 7, and may be described as a continuous moulding and batch-casting unit.

Fig. 1 shows in diagrammatic form the general layout and main features of the plant. The plant, which is of simple design, comprises a mixing plant feeding eight moulding machines with gravity roller conveyors for mould dispersal, two knock-out stations and a main storage hopper of 40 tons capacity. Provision is made at the machines for the return of spillage back to the storage hopper.

The machines take up the full width of two bays of the foundry and are located at the ends of the bays adjoining the fettling shop; the plant is thus divided into two sections, *i.e.* the light section in one bay (on the left of the diagram) and the heavy or medium in the other. Although the plant is run as two separate units, sand supply is obtained from a common mixing plant, the return sand from each knock-out station being returned to the same storage hopper.

Light Moulding Section

Four jolt-squeeze pin-lift and two jolt-squeeze turnover machines are installed in this section and a spillage grid is provided at each machine. The machines work in pairs, one making copes and the other drags; moulds are assembled on the ends of the roller tracks and moved along the tracks as completed. In the case of the pin-lift machines, these are manned by three operators—two moulding, one assembling.

The method of operation is to operate one pair of machines until the adjacent conveyor track is filled with moulds and then to switch over to the other pair of machines and again fill the corresponding track, by which time metal is available for pouring. The moulds on the tracks are poured from 5 cwt. ladles of the single operator type, mounted on overhead rails. The storage capacity of the conveyor tracks for boxes from these machines is 250 and is usually taken up by about 11.30 a.m., so that pouring is completed by noon when the lunch break is taken.

Immediately after lunch the boxes are moved around the track to the vibratory knock-out grid knock-out operation. The tracks are filled as before and poured in the late afternoon. The two turnover machines in this section are manned by two operators and moulds are poured twice a day in a similar manner.

Fig. 2 illustrates the six machines, the machine feed hoppers, a part of the roller conveyors and the mixing plant in the background, and Fig. 3 is a view of the light moulding and casting section showing the full length of roller-conveyor tracks, overhead monorail and pouring ladles; the conveyor track to knock-out station is in the foreground.

Medium/Heavy Moulding Section

Two heavy type jolt-rollover machines are installed and castings up to 25 cwt. have been produced in this section, although the general run of castings is from 3 to 10 cwt. The moulds produced from these machines may be cast green, dry or skin-dried and a gas-fired skin-drying plant is installed over the gravity conveyors of the smaller machine; the method chosen being dependent on the nature of work being produced.

FIG. 5.—*Assembly and casting section for the heavier moulds; sand beds and concrete pathways are provided.*

A general layout of this section is illustrated in Fig. 4, the machines, feed hopper, roller-conveyor tracks, skin-drying unit and knock-out station being shown. The moulds produced from these machines are moved along the gravity conveyors, picked up by overhead crane and assembled and cast in an area at the end of these conveyors.

This assembly and casting station is well shown by Fig. 5 and it will be seen that the working gangways are of concrete with sand beds for the placing of moulds for assembly and casting. All heavy cores are brought to the site from the core shop by gravity conveyor shown in the foreground of the illustration.

Fig. 6 shows a view of this assembly station with moulds in various stages of assembly and illustrates the heavy type of work undertaken on this section. Moulds are knocked-out on mechanically vibrated grids and the sand is returned to the main storage hopper by underground conveyors. This knock-out station is fitted with dust-extraction equipment of the type shown in Fig. 7. The size of the knock-out grid is 8 ft. 6 in. by 4 ft. 2 in.

Core Production

Small or light type cores are produced by normal methods using female operators and production has been mechanized to the extent of the provision of a steel-band conveyor and vertical continuous drying stove. Fig. 8 shows this layout to be the normal method of location of ramming stations on each side of the conveyor feeding cores to the stove. Synthetic resin sand is used exclusively on this section. Many cores produced on this plant have to be loaded into trucks and transported across two bays of the foundry to the light moulding section, and in order to withstand this fairly rough handling, it is essential that good hard cores be produced and it has been found possible to obtain such cores using synthetic resin, more cheaply than if linseed oil were used.

The medium and heavy cores are produced by male operators by normal hand methods, although

FIG. 6.—*Assembly station on which a number of cored-up half moulds are set out, well illustrating the heavier type of work undertaken.*

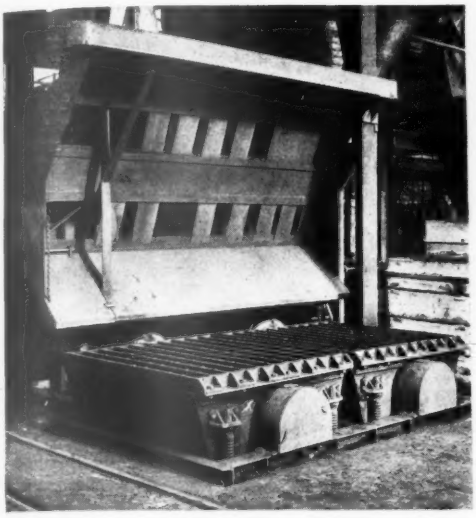

FIG. 7.—*Knock-out station, which is provided with an efficient side hood and dust-extraction system. The grid measures 8 ft. 6 in. by 4 ft. 2 in.*

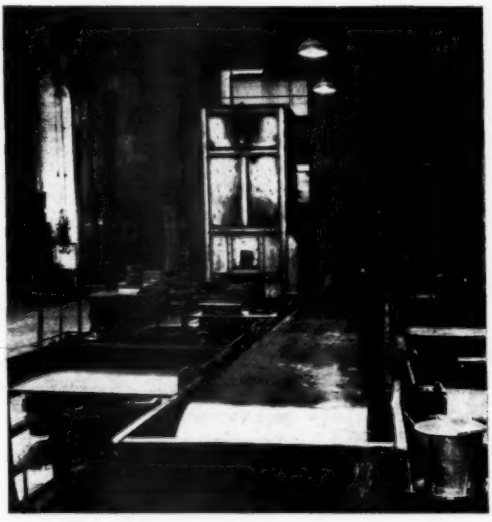

FIG. 8.—*Coreshop for small cores; it is roughly bisected by a steel-band conveyor. The latter feeds the cores to a vertical continuous-drying stove.*

the use of pneumatic rammers is applied wherever possible. In the production of large quantities of heavy cores, considerable trouble was at one time experienced due to variation in core dimensions caused by excessive rapping of coreboxes during the stripping operation. This was particularly so with cores of large dimensions and led to serious complaints from the machine shops and assembly lines and of course increased the fettling costs.

To overcome this trouble, a large core-stripping machine of the type illustrated in Figs. 9 and 10 was installed and large cores dimensionally accurate are now produced.

Fig. 9 shows this machine with a large corebox and coreplate in position ready for turnover and stripping operations, and Fig. 10 shows the core after stripping, in position on the gravity conveyor track for removal to stove. The corebox-holding clamps on the machine can be quickly adjusted to accommodate a wide range of box sizes. Boxes up to 4 ft. wide with length variation from 34 in. to 68 in. can be handled and the machine can strip cores up to 16-in. deep.

Coincident with the installation of this machine, roller-conveyor tracks, transfer bogies and sand hoppers were set up to feed cores to the machine and the general arrangement of the plant is shown in Fig. 11. Three ramming stations are located on either side of a central roller conveyor track making a total of six in all. Each station is fitted with its own sand hopper and coreboxes are rammed up on transfer bogies to facilitate easy feeding of rammed-up boxes to the central track and hence to the stripping machine.

Manning

This plant is manned by four coremakers and one machine operator. Four stations only are therefore manned at any one time, the reason for this being to avoid congestion at the machine and to enable the coremakers to move from station to station pending the return of coreboxes. Coreboxes which have been stripped by the machine are returned to any vacant ramming station by overhead crane ready for re-ramming as the coremakers move around. As cores are "stripped" they are transferred to a conveyor track at the other side of the machine, "dressed" by the machine operator and so on to the stove.

Processing—Planning

After the plant had been running for only a few months it was decided to introduce a system of control to methods of production on similar lines to that used in the machine shops of all modern engineering works. The system adopted is in effect a system of scrap control in addition to process control and has, by its application, provided an invaluable set of records of all castings produced from this plant over several years.

In order to explain the system, it is proposed to describe the procedure adopted when orders are received for castings from new patterns. All drawings for patterns are first passed to the foundry where they are scrutinized and then marked to indicate to the pattern shop the type of pattern required to meet the moulding methods decided upon.

When the pattern is received from the pattern shop it is plated and then, before sample castings

are produced from it, further consideration is given to the moulding technique to be adopted and decisions taken are recorded on a "process sheet" which is in effect an instruction sheet to the foreman. Adherence to these instructions is rigidly enforced so that methods which prove successful to any particular job are standardized.

Chart I—Example of Form of Process Sheet.

METHOD SHEET NO. 4

DESCRIPTION:—*Crankcase Gearbox. (VF)* *c. q. l.*
PATTERN NO.:—1001 *WEIGHT:*—5 3 0
CUSTOMER:—*J. Fowler, Leeds.* *MATERIAL:*—M. 42
DATE:—7.6.51.
METHOD OF PRODUCTION—
(A) HAND MOULDED
(B) MACHINE MOULDED *PATTERN EQUIPMENT*
TYPE OF MACHINE:—4,000 *lb. Pneulec.* 1 *Pattern on 2 plates*
BOX SIZE:—62*in. by* 32*in.*
TYPE OF MOULDING SAND.—*Unit Sand* *TEMPLATES:*—5 *Templates and 3 Setting Pieces.*
MOULD DRESSING:—*Standard mix.*
SPECIAL TREATMENT:—*Mould faced with oil sand on face near ingates and sprigged.*
(C) CORES—
MALES:—*Nos.* 1, 2, 3, 4, *and* 6.
FEMALES:—*Nos.* 5, 7, 8, 9, 10, 11, 12, 13, 14 *and* 15.
TYPE OF CORE SAND:—*Standard mix.*
CORE DRESSING:—*Standard mix.*
(D) RUNNER SYSTEM—
3 *Ingates* 2¼*in. by* ⅛*in.* = 1.265 *sq. in.*
Runner Bar 1*in. by* 1¾*in.* = 1.75 *sq. in.*
2 *Downsprues* 1¼*in. diamater* = 1.98 *sq. in.*
POURING TIME:—35 *to* 37 *seconds*

An example of the form of the Process Sheet used is shown in Chart I. It will be noted that all relevant information is shown on the sheet including moulding and core sand mixes, mould and core dressing used and a place is reserved for the recording of any special measures which may have to be taken. Provision is also made for the recording of the runner system dimensions and pouring time.

A sketch of the casting showing the joint line, position and details of runner system and location of any chills, etc., which may be used is made on the reverse side of the Process Sheet. Sample castings are made to the instructions indicated on the process sheet and if satisfactory results are obtained the methods are standardized, although minor alterations may be made in the light of experience gained during subsequent production. Such alterations are recorded on an amended process sheet and filed with the original. If, as occasionally happens in all foundries, the sample casting is not satisfactory, then any modifications are recorded again on an amended sheet as before and filed with the original.

It may be that with a particularly troublesome job, several modifications may be necessary before methods can be standardized and again, amended sheets are made up for each alteration to method until success is achieved. In this way, a case history of all castings is obtained which is, of course, very often of considerable help when considering castings of similar types which may be required in the future.

When this system of control was first introduced some thought was given to the personnel required to run it and a "foundry-pattern-shop liaison officer" was eventually appointed. The man chosen was a trained patternmaker who had obtained further education at a technical college and since his duties include the fixing of piecework prices in the pattern shop and the checking of all new patterns, he is thus able to follow up the production of sample castings from the drawing board to completion and to keep the necessary records.

All decisions regarding methods of production are made by a team of three—foundry manager, foundry foreman and liaison officer and the implementation of these decisions is the responsibility of the liaison officer for samples and the foreman for production.

Production programmes for the plant are made up monthly; these are issued to all concerned and the liaison officer is responsible for ensuring that all patterns are in good condition, together with

FIGS. 9 AND 10.—*Core-stripping machine; Fig.* 9, *large core and box ready for turning over and Fig.* 10, *the core stripped and positioned on the roller track for removal. The clamps holding the corebox can be quickly adjusted to take boxes up to* 4 *ft. wide, with a length variation from* 34 *to* 68 *in. Cores up to* 16 *in. deep can be stripped.*

FIG. 11.—*Four of the stations in the heavy core making shop share a common roller track leading to the turnover/stripping machine.*

the necessary templates, etc., are available on the dates required.

It is suggested that for the successful running of a plant of this type where a wide variety of work is undertaken, the foundry-pattern-shop liaison officer is an essential member of the production team.

Having given a general description of the plant and briefly outlined a system of process control, it is now proposed to describe production methods applied to several castings in regular production. The type of work produced on the medium-heavy section is perhaps of more general interest and it is therefore intended to limit remarks to this section.

(*To be continued*)

Increases of Capital

GALVANIZERS, LIMITED, Scotstoun, Glasgow, increased by £22,500, in £1 shares, beyond the registered capital of £7,500.

POWER DIESELS, LIMITED, Weybridge (Surrey), increased by £5,000, in £1 ordinary shares, beyond the registered capital of £7,000.

GEORGE TAYLOR & SON (ENGINEERS), LIMITED, Coventry, increased by £9,800, in £1 ordinary shares, beyond the registered capital of £10,000.

A. REYROLLE & COMPANY, LIMITED, Hebburn (Co. Durham), increased by £1,000,000, in £1 ordinary shares, beyond the registered capital of £3,000,000.

BRIGHTSIDE FOUNDRY & ENGINEERING COMPANY, LIMITED, Sheffield, increased by £350,000, in 1,400,000 ordinary shares of 5s., beyond the registered capital of £500,000.

PLATT MALLEABLE CASTINGS, LIMITED, Walsall (Staffs), increased by £30,000, in 8,000 preference and 22,000 ordinary shares of £1 each, beyond the registered capital of £20,000.

Recent Wills

CHAWNER, J. S., formerly a director of Stewarts and Lloyds of South Africa, Limited £9,878

PARSONS, C. E., who was for many years a member of the council of the Institution of Mining and Metallurgy, and vice-president of the institution from 1938-41 ... ... £27,755

LEITCH, G. A., late chairman of Cannon Iron Foundries, Limited, Bilston (Staffs), and a director of Charles H. Pugh, Limited, manufacturers of motor lawn mowers, of Birmingham £48,293

FINCH, ROLAND, former joint managing director of the Metals Division of Imperial Chemical Industries, Limited, and for a time acting chairman of Steatite & Porcelain Products, Limited, Stourport-on-Severn (Worcs), who was president of the International Conference of Non-ferrous Metal Manufacturers, 1946-52 ... ... £2,224

Parliamentary

Production and Distribution Censuses

The present cost of the annual census of production required by the Statistics of Trade Act, 1947, was about £175,000, said MR. PETER THORNEYCROFT, President of the Board of Trade. He told SIR WALDRON SMITHERS that the total cost of work on the first census of distribution, which began in 1949 and was completed but for collation and publication by the end of 1951, would be some £710,000.

It was essential, he said, that the cost of any such work should be justified by the benefit that it brought to industry and the community. He had accordingly appointed a committee, including representatives of industry and commerce, under the chairmanship of Sir Reginald Verdon Smith, to advise him on future policy with regard to the taking of censuses of production and distribution. The committee was examining *inter alia* the uses to which the censuses were put.

Scientific and Technological Research

The Department of Scientific and Industrial Research is about to make arrangements with the Scottish Council for a study of the special needs of small firms in Scotland for research and technical information, said MR. JAMES STUART, Secretary of State for Scotland, who, in reply to MR. HANNAN, also said that there was a free exchange of research information between the universities, industrial research associations, and the D.S.I.R., which operated a technical information service available to large and small firms alike. The research associations provided industrial liaison services to their member firms.

THE Development of Inventions Bill passed the remaining stages in the House of Commons on February 1.

THE British Industries Fair (Guarantees and Grants) Bill was presented by the President of the Board of Trade in the House of Commons on February 3 and read a first time.

THE First Lord of the Admiralty stated that discussions about the construction of a large graving dock on the Clyde were proceeding between the local bodies concerned. He understood that the stage had not yet been reached when firm proposals could be made.

MR. HEATHCOAT AMORY, Minister of State, Board of Trade, stated that last year the United Kingdom imported from the Soviet Union 27,600 tons of manganese ore valued at £501,000. 20,900,000 troy oz. of silver bullion valued at £6,383,000, and 94,900 troy oz. of platinum valued at £3,142,000.

THE Secretary of State for Scotland told Mr. Hannan that he understood that the Mineral Resources Panel of the Scottish Council had recently completed an inquiry into the deposits of dolomite in Scotland, and the possibility of their utilization, and that a report was being prepared. The council also had in hand an inquiry into the resources of silica rock.

THE OBJECT of the Safety in Employment (Inspection and Safety Organization) Bill (particulars of which are given on page 164) is to introduce accident-prevention machinery, based on co-operation between employers, employees, and official inspectors. The explanatory memorandum of the Bill states that the annual rate of accidents in all employment is around 700,000.

European Steel Export Prices

Now that the European Steel and Coal Community's new steel-price rules appear to allow some latitude from the original rigid rules, the High Authority is again being pressed to consider allowing producers to sell steel at lower prices to consumers whose finished products are for export. Steel consumers who export their finished goods have for some time been complaining that the high price of steel makes it impossible for them to compete in export markets. Steel producers are naturally interested in a lower price if it means that their sales to these consumers will rise. The High Authority has, therefore, drafted a proposal decision on this question which has been circulated to the members of the Consultative Committee and the Council of Ministers. It is to be considered by the former on February 25, and the latter on March 8.

At a meeting of the community's Consultative Committee, consisting of producers, consumers, and trade unionists, the High Authority's investment policy was again considered. Opinions were expressed that the proposed investment in raw materials would not help the flow of steel or domestic coal supplies. Others considered that the High Authority should consider investment in iron-ore deposits outside the six countries. Coal producers insisted that the programme of modernization must be carried out if costs were to be lowered and production increased. Several members stressed the importance of improving workers' housing conditions. Requests were made that the lowest possible rate of interest should be charged on loans and the longest possible time be given for repayment.

The French representatives raised the question of rail freight discrimination and regretted that no decision had been taken to end the situation whereby the German railways favour the Ruhr industry in the operation of their freight rates. M. Monnet replied that the High Authority's commisssion on the subject would make recommendations to the governments concerned, but the governments, not the High Authority, were responsible for action on these proposals.

Among other questions discussed was the long-term demand for coal and steel, and the committee requested the High Authority to consider ways of stimulating demand.

Iron-ore Imports

Iron-ore imports in December and the total for the year, with comparative figures for 1952, are shown below.

Country of origin.	Month ended December 31.		Year ended December 31.	
	1952.	1953.	1952.	1953.
	Tons.	Tons.	Tons.	Tons.
Sierra Leone	75,160	52,440	788,883	779,426
Canada	9,550	91,747	621,855	1,119,234
Other Commonwealth countries and Eire	12,843	1,064	95,085	188,177
Sweden	300,667	297,255	3,643,695	3,806,196
Netherlands	1,210	640	39,870	27,718
France	58,240	38,065	438,848	448,016
Spain	43,558	31,353	663,967	442,665
Algeria	139,450	152,003	1,711,556	1,862,920
Tunis	34,800	55,525	557,747	581,372
Spanish ports in North Africa	15,600	—	253,163	—
Brazil	8,840	26,894	99,981	306,600
Other foreign countries	66,432	117,707	775,539	1,408,285
TOTAL	766,350	864,693	9,690,189	10,970,609

Notes from the Branches

Newcastle-upon-Tyne

Members of the Newcastle-upon-Tyne branch of the Institute of British Foundrymen were particularly fortunate in having their first meeting of the year graced by a visit from the president of the Institute, Mr. E. Longden, and the general secretary, Mr. T. Makemson, M.B.E. There was a large attendance of members and visitors to welcome them. Unfortunately, owing to illness, the branch president, Professor A. Preece, was unable to be present and in his absence the chair was taken by Mr. Colin Gresty, who, on behalf of the members as well as himself, welcomed Mr. Longden and Mr. Makemson.

Mr. Longden, whose work for the Institute and for the advancement of the foundry industry is well known on the North East coast, was well received. After thanking the members for their reception, he said the production of sound castings was complex and the experiences of those engaged in the industry in all parts of the country were needed to help towards its advancement. At meetings organized by the Institute, opportunities were presented for the discussion of the many problems associated with the industry. By combining theory and practice in approaching problems of production, satisfactory solutions had been effected and progress achieved. This was the primary objective of the Institute and there was ample evidence that the Newcastle branch had contributed to the great advancement made in the last 50 years and Mr. Longden felt sure that this upward trend would continue.

Mr. Makemson, who had often visited this branch on previous occasions, reminded members that it was 27 years since he first came, and pointed out that this was the 50th year of the Institute's formation; the first meeting having been held in Birmingham. It comprised a gathering of six men interested in the project; a president and secretary were elected and the remaining four formed the Council. They called themselves the British Foundrymen's Association. To celebrate the golden jubilee of the occasion, a Banquet was to be held in London on April 9 next, preceded in the afternoon by Papers prepared specially for the occasion. He hoped that the Newcastle branch would be represented at that function because it had been one of the earliest branches to be formed.

The Chairman next called upon Dr. R. N. Parkins to present his Paper "Residual Stresses in Castings",* and in doing so complimented him on his energy, reminding members that Dr. Parkins had presented a Paper at the Blackpool conference of the Institute which caused considerable discussion. He was assured that the present Paper was the result of further experiments and provided new matter. It would be remembered that the earlier Paper was concerned with effects of mould resistance on internal stress in sand castings; in the present case attention was directed more particularly to the effect of temperature differences during the cooling of castings.

Works Visit

A record attendance was obtained on the occasion of a works visit to Westinghouse Brake and Signal Company, Limited, at Chippenham, the visit being followed by a lecture on patternmaking by Mr. S. A. Horton. A party of over one hundred members and friends was conducted through the foundry, pattern- and coreshops, and much interest was aroused in the process for producing aluminium matchplates from plaster casts, while the core-assembly models were the subject of much favourable comment from all visitors and members.

In his talk, Mr. Horton indicated many of the problems of patternmaking and maintenance in a foundry supplying thousands of castings from various patterns weekly. In addition, the lecturer pleaded for more co-operation between the various foundry, core- and patternshops, while the help of design departments could often be enlisted to simplify moulding, core and pattern practice.

Replying to the many questions which the Paper evoked, Mr. Horton made the following points: No hard and fast rules could be laid down for the venting of coreboxes for blowing, but it was often found that previous experience on similar types acted as a good guide. The chromium plating of aluminium coreboxes, although resulting in good wear-resistance, could seldom be justified on account of the increased cost. When production called for fewer than a thousand components, wood or wood/metal patterns were most satisfactory, but for larger quantities metal patterns were favoured.

Mr. H. Balme, in proposing a vote of thanks to Mr. Horton, agreed with the remarks regarding close liaison between foundry and coreshop, and thanked the lecturer for the full and frank manner in which all questions had been answered. Mr. W. Hares seconded the vote of thanks.

Mr. D. H. Potts, a branch member, was then presented, by Mr. L. Buckley, the branch president, with a Diploma awarded by the Institute for his Paper, "Pressure-cast Aluminium Pattern Equipment". Mr. N. G. Cadman, works manager of Westinghouse Brake and Signal Company, then offically welcomed all present on behalf of the company, who kindly entertained members and visitors at tea.

*A summary will be printed shortly in the JOURNAL—EDITOR.

Lancashire

Referring to the contribution which the Lancashire branch had made to the overall technological knowledge of the industry, Mr. E. Longden, M.I.Mech.E., president of the Institute, told those assembled at the annual dinner/dance on January 30, when proposing the toast of "The Branch", that in any section of the organization, there were both the practical and the academic men represented. As his own sense of proportion had developed, he had been less able to see a clear definition between what was termed "practical" and what was termed "theoretical". Whatever advance was made in practice, it was born in the mind of, say, a moulder, a metallurgist, or a scientist. To some was given the power to see at an early stage the hopelessness of waiting for a purely theoretical solution, in view of their experience.

Mr. F. A. Harper, the president of the branch, replied and other toast and responses were: "The Visitors," by Mr. R. Yeoman, the immediate past-president of the branch, who deputised at short notice for Mr. E. Jackson, the senior vice-president, who was indisposed. Mr. John Bell, senior vice-president of the Institute, replied for the visitors. Mr. G. Lambert, assistant general secretary, toasted "The Ladies", and Mrs. F. A. Harper replied. The junior vice-president (Mr. A. Kirkham) of the branch proposed the toast "The Branch Secretary", to which Mr. F. W. Nield replied. During the course of the evening, Mr. John Jackson, a past-president of the Lancashire branch and president of the Burnley section, presented a silver tray to Mrs. Harper on behalf of the branch.

Notes from the Branches

London : Beds and Herts Section

This section, though less than a year old, last Friday organized a dinner, a function which attracted about 70 members and guests. It was held at the Bridge Hotel, Bedford, and was presided over by Mr. E. Daybell, who, in a short address, said that the section had held four technical meetings at which the average attendance was 75. The toast of the section was proposed by Mr. Frank Rowe, and replied to by Mr. V. C. Faulkner, past-president of the Institute. "The Visitors" was proposed by Mr. H. W. Keeble and replied to by Mr. W. T. Hobkirk. Mr. L. A. S. Harbourne acted as toastmaster, whilst the arrangement of the function was carried out by Mr. W. Twaddle. The company was entertained by Mr. N. Tomkins (xylophonist) and Mr. J. H. Evans (magician), both local artistes. Amongst those present were Mr. B. Levy, Mr. W. G. Mochrie, and Dr. Ivanhoff.

S. & L. Elongation Calculator

Stewarts and Lloyds, Limited, have made available, free of charge on application to Brook House, Upper Brook Street, London, W.1, an Ivorine card for the inter-conversion of percentage elongations corresponding to different gauge lengths of metal test-pieces. The following explanation accompanies the offer:—

One of the most commonly specified mechanical properties of steel malleable and non-ferrous castings is the percentage elongation, as found by a tensile test of the material. Unfortunately it is frequently incompletely specified, so that anomalous differences exist between the values required by different standards, and the severity of the requirements of a particular standard may vary with the test-piece used. For a given alloy, for instance, one having a tensile strength in the range of from 20 to 40 tons per sq. in., the percentage elongation will be the same, when determined from cylindrical or rectangular test-pieces of any normal dimensions, provided that for each the gauge length, L, bears a constant ratio to the square root of the cross-sectional area, A. This ratio is generally 4, where used in British Standards, that is:—

$$L = 4\sqrt{A}$$

On this basis, the recent revised edition of B.S. 806 specifies that all percentage elongations shall be as measured on a gauge length equal to $4\sqrt{A}$, thus making them directly comparable. This presents no difficulty for circular test-pieces, machined all over. For rectangular test-pieces, such as those from plates, it is necessary for economy in testing to standardize a few lengths and widths, letting the cross-sectional area vary with the thickness. The percentage elongations so determined are not directly comparable, even with each other. It is therefore necessary to convert them into the equivalent values which would have been found on a gauge length of $4\sqrt{A}$, when all the results are directly comparable. Provision for this has now been made in B.S. 806:1954, Appendix D, which is based on the analysis of many experimental results. The contents of that standard have now been summarized on the Ivorine card and its envelope, together with method of use and examples. It is hoped that by facilitating the conversion of test results to a rational basis and so making them comparable, it will help to rationalize the specifying of percentage elongations in this country.

Non-ferrous-swarf Melting Data

The Morgan rotary crucible furnace has now established itself as predominantly suited for the melting of non-ferrous swarf and now the following average figures are claimed for the reclamation of yellow-brass and gunmetal swarf:—

60/40 *Yellow-brass swarf*: 6-*cwt. charge.*

—	Time.	Fuel. Gas (500 B.Th.U.).	Oil.
	Min.		
Warming-up	30	600 cub. ft.	2 gall.
First melt ..	105	570 ,, ,, per 100-lb. metal melted	16 per cent. by weight of metal melted.
Second ,, ..	65	375 ,, ,, ditto	11 per cent. ditto
Subsequent melts ..	60	350 ,, ,, ditto	10½ per cent. ditto

Daily Output: 8-hour working day = 5 melts = 3,300 lb.
9½- ,, ,, ,, = 6 ,, = 4,000 ,,
24- ,, ,, ,, = 16 ,, = 10,000 ,,
Recovery: 90 to 97 per cent., depending upon purity of charge.

Gunmetal 85/5/5/5—670-*lb. charge.*

—	Time.	Fuel. Gas (500 B.Th.U.).	Oil.
	Min.		
Warming-up	30	600 cub. ft.	2 gall.
First melt ..	120	650 ,, ,, per 100-lb. metal melted.	19 per cent. by weight of metal melted.
Second ,, ..	80	450 ,, ,, ditto	13 per cent. ditto
Subsequent melts ..	75	425 ,, ,, ditto	12½ per cent. ditto

Daily Output: 8-hour working day = 4 melts = 2,600 lb.
9½- ,, ,, ,, = 5 ,, = 3,300 ,,
24- ,, ,, ,, = 13 ,, = 8,600 ,,
Recovery: 93 to 99 per cent. depending upon purity of charge.

Travelling Scholarships

The Worshipful Company of Tinplate Workers *alias* Wire Workers, one of the City of London Guilds, is again this year offering 10 travelling scholarships, each to the value of £50, on the same terms and conditions as before. These in the main are that the candidates must be between the ages of 18½ and 22, war or military service can be deducted from the age, and the application form must be sponsored by a trade association or trade union in some way connected with the name of the company. This latter requirement is treated very broadly and includes almost all branches of engineering as well as founding. The scholarships will enable the holders to make tours of at least four or five weeks' duration for the purpose of studying the practices of their trade.

Forms of application (which must be completed and returned before March 31), are obtainable from Mr. A. L. Johnson, chairman of the Company's educational committee, at Haywood House, Stewkley, Leighton Buzzard, Beds. After that, applications are examined and those candidates who are fortunate enough to get on to the short list are granted an interview and at a later date the education committee of the Worshipful Company decides on the successful candidates.

Candidates are also required to submit an essay on their tour, stress being laid that in addition to a description of the processes they may have seen, something about their personal experiences is required. These essays would be from 1,500-2,000 words in extent.

Pressure-cast Aluminium Pattern Equipment*

Further discussion of Mr. D. H. Potts' Paper

When the Paper on this subject was originally presented at the London and Birmingham branch meetings of the Institute considerable discussion was recorded. What follows is an abstract from the report of the Lancashire branch meeting, where further points were elaborated, including venting; plaster mixing; drying control; incidence of shrinkage; standardization; drying and casting procedure and the possibility of buckling and cracking.

Before the meeting took place, Mr. E. Longden, the president of the Institute, presented Mr. Beech and Mr. Hoyes with diplomas for their joint Paper "Core Assembly as a Production Aid to the Jobbing Founder."

After a cordial vote of thanks had been accorded to Mr. Potts on the proposition of MR. LONGSTAFFE, seconded by MR. JACKSON, MR. SPENCER opened the discussion by asking at what stage were the plaster moulds vented.

MR. POTTS said this took place before drying.

A MEMBER asked for details of the thin asbestos sheet which went on the bottom, such as for instance the type of asbestos used. When the amount of aluminium above it was increased, did the thickness of the asbestos become greater?

MR. POTTS replied that he used what was called the soft type of asbestos supplied by the firms which furnished the plaster. The thickness of the washer was $\frac{1}{16}$ in., and for the heavier moulds two washers were inserted.

Degassing

MR. WALKER asked whether any de-gassing agent was used and for what length of time he maintained the air pressure of the cylinder.

MR. POTTS replied that the same technique was used as when making pressure-tight castings in aluminium for production purposes, the alloy L. 33 being used. The air pressure was left turned on until the metal solidified, that was about 30 to 40 mins.

MR. TAYLOR asked whether the casting temperature was varied according to the dimensions of the casting.

MR. POTTS replied that initially it was about 615 deg., later 610 deg., and finally was stabilized at 605 deg. C.

MR. WARREN asked if the receiver was warmed before pouring in the aluminium, or was it adjusted to 605 deg. C.?

MR. POTTS said the moulds were taken straight out of the oven and were still warm when poured.

MR. WARREN asked if a proprietary stripping agent was used.

MR. POTTS said that initially ordinary machine-oil was used as a stripping agent, later the following agents were used in them:—

(1) Petroleum jelly—1 part by weight.
kerosene—2 parts by weight.

(2) 3 pints kerosene (warm).
6 oz. stearic acid.
1/10 oz. "Aercol."

(3) A proprietary stripping agent recommended for this application. (This has so far proved the most successful.)

Plaster

MR. POTTER asked for details of mixing the plaster.

MR. POTTS gave the following details:—

Water 125 parts, and plaster 100 parts each by weight. The plaster was sprinkled into the water, stirring all the time so that no lumps were formed. The scum was then skimmed off and the plaster was ready for use.

MR. ROBSON said that it would appear that as only one pattern was being used much box room was being wasted. Would it not be better to envisage the expense of a number of patterns and so use the box to its fullest extent?

MR. POTTS replied that it was not necessary to have more than one master pattern, as from this one first made a series of individual moulds, as previously described and illustrated and thereby the full space of the moulding boxes could be filled.

Drying Efficiency

MR. JOWETT (a member from the West Riding) asked whether it would not be better to develop some means of ascertaining the moisture content in the moulds during drying.

MR. POTTS said the present method of stoving was as follows: 24 hours were allowed with the oven set at 340 deg. C. A small hole was made in each mould and at the end of the period a thermometer was placed in this hole and the temperature taken. If this did not register 210 deg. C., stoving was continued.

MR. COLLINGE suggested that in the event of possible modifications to the castings, it might be found cheaper to reproduce a complete plate as against individually mounted patterns? He found it easier to modify a plate on which patterns were

* Paper printed in the JOURNAL, June 11, 1953; previous discussion July 16, 1953.

Pressure-cast Aluminium Pattern Equipment—Discussion

mounted than to get another pressure-cast plate made. On some of the pressure-cast plates he had often encountered internal shinkage after they had been machined. Could this be due to a too-high casting temperature ?

MR. POTTS said that with the initial experiments carried out in the foundry he did not meet this internal shrinkage problem, but when a department equipped specifically for this process was created, considerable trouble was experienced. Many of the plates suffered from internal shrinkage and also bad sinks. This eventually was traced to the fact that the plaster was a very bad conductor of heat. The oven *was* set at 210 deg. C. and this was insufficient to dry the centre portions of the mould. By stepping-up the oven temperature as previously mentioned and by artificially venting the moulds this difficulty had been completely overcome. During the past eight months he had cast over 150 pattern plates without the fault recurring. He suggested that every foundry must study the economics of the process within its own organization. His concern, for instance, often found it cheaper to make a new plate, rather than alter either the running system or any of the impressions cast integrally with the plate.

MR. CONNOR asked whether it would be an advantage to have separate runners leading to each impression.

Standardization

MR. POTTS said an endeavour had been made to standardize methods wherever possible. Before putting a new plate in hand, the foundry, using the master pattern, had a trial casting made. From this was decided the type of runner which would be adopted on the pattern plate. If a number of patterns were mounted on one plate by this method the runner to each impression would be identical. Having standardized the running system, it was sometimes found that the castings furthest from the down-gate were not as good and the runners had then to be modified.

MR. SHEPPARD said he had conducted a fair amount of research on this process and one of his problems was associated with joint of the two moulds. It was found that the plaster tended to shrink and, secondly, when the two halves were brought together a gap of up to 1/10 in. thick appeared. Another point was, had the author experimented with the plaster using warm water ?

MR. POTTS, in reply, said that on very cold days he had used warm water to some advantage. As to shrinkage and sagging he had so far not experienced this difficulty. He suggested sagging could occur if the moulds were stripped from their moulding positions before they had completely set.

MR. SHEPPARD asked if both half moulds were in the initials stages dried joint to joint.

MR. POTTS replied that the practice was to stove the moulds on edge.

MR. HAYES asked whether a shellac varnish would be better than a water-resistant varnish, and why were the moulds cast at an angle of 15 deg.

MR. POTTS replied that by casting upwards at an angle of 15 deg. he considered that less turbulence was set up in the mould. The finish obtained would appear to substantiate this.

MR. LONGDEN said he was interested in the pressure of 5 to 8 lb. per sq. in. exerted on the metal. Already acting was an air pressure of some 14.87 lb. per sq. in. To this could be added the static head of metal raising the pressure per sq. in. to about 22 lb. It would appear that a further 5 to 8 lb. per sq. in. did not have a profound effect. He suggested that the success of the process lay in weighing the metal and then releasing it with a steady movement.

MR. POTTS said he had tried casting under gravity pressure conditions only and had obtained rather poor results. The best results to date had been obtained when using a pressure of 5 to 8 lb. per sq. in. He had used higher pressures, *i.e.* 12 to 15 lb. per sq. in., but found that this tended to buckle the moulds. In America, where he first saw the system practised, they were using a pressure of 5 to 6 lb. and he decided to emulate their methods.

MR. GRAHAM asked whether the author had experienced any buckling of the plates after they had been removed from the plaster moulds ?

MR. POTTS said occasionally this had happened. As, however, aluminium was used they could often be straightened satisfactorily.

MR. WALKER asked whether the temperature was brought up gradually or were the plaster moulds placed straight into the full heat of the oven.

MR. POTTS said that according to the technical people making and selling the plaster, it was more important to reduce the temperature gradually than raise it quickly. Until all the free water had been driven off, the mould could not rise above the temperature of 100 deg. C.

MR. COLLINGE, referring to internal shrinkage when making a larger casting, said the metal receiver must obviously be well filled with metal for, as this went down, did not the air pressure decrease.

Receiver Details

MR. POTTS, disagreeing that the air pressure itself decreased, said that the metal receiver was connected to a "live" air-line, for as the metal went into the mould, more air passed into the receiver and the pressure therefore remained roughly constant.

MR. FLEMMING asked whether any special precautions were taken to prevent air leakage from the metal receiver. He remembered that in the early days when he started experimenting with the process he had considerable difficulty in maintaining the air pressure in the metal receiver.

MR. POTTS said that, as illustrated when the Paper was published in the FOUNDRY TRADE JOURNAL, the metal receiver was built into the casting unit and comprised a top plate, metal receiver, and top cover. The receiver, which was welded to the top plate, was lined with plaster

approximately ½ in. thick. The bottom of the receiver was sealed off from the mould by an asbestos disc which fitted nicely within the receiver and was pinned to the plaster lining. After pouring metal into the receiver, the top cover was clamped tightly into position. This cover was grooved to fit the receiver and so provided an adequate air seal.

So far, he had not experienced any difficulty with the plaster contracting. It was important that mixing, stoving and casting were all carried out according to the instructions of the plaster manufacturers.

MR. FARRELL asked if, when the bottom half-mould was made, the parting agent applied soaked into the plaster and caused the joints to stick.

MR. POTTS said this difficulty had not been experienced. The parting agent was applied to the bottom half-mould after it had set and it should therefore not penetrate into the plaster.

Casting Practice

MR. HARVEY asked for the period of delay between taking the mould out of the oven and casting.

MR. POTTS said this operation should be carried out as quickly as possible. The shop started at 7.30 a.m. and by noon four complete moulds would be cast.

MR. LONGSTAFF asked whether it had been found necessary to use chills.

MR. POTTS said he had never found this practice necessary, as, wherever possible, the thick portions were cored out, using either plaster or sand cores. If this was not possible small aluminium denseners were sometimes used. These were about the size of a 2-in. nail, the tail of which was pushed into the plaster, leaving the head in the centre of the thick section. As a member of the Brass Foundry Productivity Team, he formed the impression that the pressure-cast plaster process method of making patterns had been adopted as a standard method of pattern production in America. This impression was formed after visiting approximately 23 brass foundries handling a variety of castings. He estimated that approximately 80 per cent. of the production in each foundry visited was obtained from aluminium matchplates made by this process. Two firms making patterns by the process were themselves visited and, as far as he could recollect, each firm produced one plate per day for every person employed.

Cracking Danger

MR. HARVEY asked whether a plate had been known to crack under pressure from the machine head.

MR. POTTS said this had never occurred with his practice. All plates manufactured by his concern were used in their own foundry where the jolt-squeeze machines were relatively small, the squeeze cylinder being only 9 in. dia., and he had no personal experience of plates used on other machines equipped with large squeeze cylinders. In America this point did not seem to be considered. No wear-resisting inserts were used with these plates, and as the system had been in production for only 18 months it was difficult to judge what their ultimate "life" would be. So far there was no evidence of any wear taking place and he would suggest that aluminium patterns of this type would easily produce 5,000 moulds.

MR. MANNING asked for details of the speed of entry of the air into the receiver.

MR. POTTS said the air was introduced into the receiver as quickly as possible, passing through a combined air filter and pressure-reducing valve. The average thickness of plate used was approximately ¼ in. To save metal the central area of a plate was sometimes reduced by ¼ in.

Process Economics

MR. FLOWN asked for details of the economic set-up of the process, and the type of labour employed.

MR. POTTS said that in the department handling this process there were two skilled men, two process workers, and two girls. When all worked 44 hours he received 22 to 24 plates per week. With this rate of production he could often afford to cater for any orders involving 100 castings and upwards.

MR. JOWETT asked whether Mr. Potts used a maximum and minimum of plaster thickness around the patterns *vis-à-vis* shrinkage.

MR. POTTS said, providing stoving was carried out correctly, the thickness of the plaster had little bearing on the question of shrinkage.

Answering further questions, MR. POTTS said the plaster was not recovered and that plates which had been in store for nine months showed no signs of deterioration. After a foundry trial casting had been made, the plate was returned to the pattern stores and was then coated with shellac; this had so far prevented any deterioration in the equipment. Provided the plaster was kept in a relatively dry atmosphere he had found that it could be stored for at least nine months. This was not a serious problem as the turnover was fairly rapid.

Higher Freight Rates Opposed

A call to the Government not to grant any substantial increase in rail freight rates has been made in a memorandum to the Minister of Transport by the Association of British Chambers of Commerce. The Association also makes a plea for the establishment of a working party to investigate economic problems of the railways. Its opposition to a new increase of 10 per cent. in freight charges is that it would merely continue the spiral of operating costs chasing freight charges and would not solve the railways' economic problems.

The Association admits that there may be justification for permitting a small increase in charges to cover the cost of the recent wage awards, but it believes that any further advances in the wages of railway staff should be related to increased efficiency, and the transfer of redundant personnel to other branches of industry and commerce. It is suggested that the inquiry into railway economics should be undertaken by a working party representative of the Government, the British Transport Commission, trade unions, and transport users.

Liquid Metals as Heat-transfer Fluids

The use of liquid metals as heat-transfer fluids was referred to by DR. T. W. F. BROWN, research director, the Parsons and Marine Engineering Turbine Research and Development Association, in the course of the Thomas Lowe Gray Lecture delivered last month to the Institution of Mechanical Engineers.

Recent developments in the use of liquid metals (such as sodium and sodium-potassium alloy) as heat-transfer fluids in the development of nuclear power plants, said the author, have opened up the possibility of their use as reheating media in steam-turbine plant. The liquid metal would transfer heat from a heater section in the boiler to a heat exchanger adjacent to the turbine. This would eliminate the large hot-steam pipes between turbine and boiler and replace them by the much smaller pipes carrying liquid metal. Thus two stages of reheat would become feasible in marine use and pressure drops on the steam side could be limited to, say, 5 per cent of the pressure head with a compact design of reheater.

Circulation of the liquid metal requires little power. Even at inlet conditions of 600 lb. per sq. in. and 950 deg. F. (510 deg. C.) with four stages of feed heating, the gain due to liquid-metal reheating would be 8 per cent, a figure which might well justify the increased cost and complexity of the liquid-metal circuit. Mechanically, reheat would reduce moisture in the low-pressure stages and would permit higher blade-speeds, without erosion being an important factor.

Continuous reheating in the turbine, using liquid metal in the fixed blades or diaphragms of the turbine, is unlikely in the author's view to be used since too little area is available in such parts for heat transmission to enable appreciable gains to be achieved. Special precautions would, of course, be necessary to prevent the liquid metal from coming into contact with air or water, but successful operation of pilot plants in Britain and the United States proves that the difficulties can be overcome. In any event highly superheated steam at high pressure is itself a dangerous fluid.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained.

BOURNEMOUTH, February 20—150 cast-iron street lighting columns, mounting brackets, etc., for the Borough Council. The Borough Engineer's Department, Town Hall, Bournemouth.

BRIERLEY HILL (STAFFS), February 19—Supply of cast-iron manhole covers and gully grates for the year ending March 31, 1955, for the Urban District Council. The Engineer and Surveyor, Hawbush House, Brierley Hill.

BROWNHILLS (STAFFS), February 15—Supply of cast-iron manhole covers and frames, and cast-iron gully grates and frames, for the Urban District Council. Mr. Charles H. Hunt, engineer and surveyor, Combe House, Brownhills.

OSWALDTWISTLE (LANCS), February 15—Supply of cast-iron pipes and special castings for the 12 months ending March 31, 1955, for the Urban District Council, The Surveyor, Town Hall, Oswaldtwistle.

PAKISTAN, February 22—Cast rods of phosphor bronze, for the Deputy Director General, Department of Supply and Development, Sadarghat, Chittagong.

SLOUGH (BUCKS), February 22—Supply of cast-iron manhole covers and frames and gully grates and frames, for the year ending March 31, 1955, for the Borough Council. Mr. E. Gardner Thorp, borough engineer, Town Hall, Slough.

STIRLING, March 12—Supply of cast-iron frames and gratings for the year from May 16, 1954, to May 15, 1955, for the County Council. The County Clerk, County Offices, Viewforth, Stirling.

More Diesels for B.R.

Plans to extend the use of multiple-unit lightweight Diesel trains on British Railways have been announced by the British Transport Commission. In addition to the schemes in the West Riding and west Cumberland, it has been decided to provide similar services as soon as possible in Lincolnshire, in East Anglia, between Newcastle and Middlesbrough, and between Edinburgh and Glasgow.

All four schemes will be partly in substitution for existing steam services, and partly in addition to them. The greater economy and flexibility of the Diesel railcars on selected routes is expected to enable existing steam services to be worked at lower cost.

The total expenditure which has been approved on this type of development on British Railways now amounts to over £2,000,000. Eight two-car units for the West Riding, 13 for west Cumberland, and 13 for Lincolnshire, are being built at the Derby works, London Midland Region, with Diesel engines supplied by contractors. The units for the West Riding are expected to be complete about the end of April, and those for west Cumberland in the autumn, to be followed by those for Lincolnshire. Production arrangements for the 13 two-car units for East Anglia, 10 motor vehicles and 10 trailers for the Newcastle-Middlesbrough services, and the six multiple-unit train sets and eight spare vehicles for the Edinburgh-Glasgow.

Molybdenum Shortage Ended

The "free" world can now get all the molybdenum needed, as a result of the expansion programme just completed by the Climax Molybdenum Company and the consequent ending of export quotas. This programme has increased capacity to an anticipated output in 1954 of 19,000 tons. The company's molybdenum mine at Climax, Colorado, is now the largest underground mine in North America. The expansion at Climax has raised free world capacity by two-thirds since the outbreak of the Korean war. This capacity is now more than 29,000 tons, or well over twice as much as all the molybdenum consumed by the free world annually in the four years after the conclusion of the last war. The United States Government lifted all domestic controls from molybdenum on June 30, 1953, and on January 14 last ended the quota system with which it had controlled the amount of metal shipped abroad. Any British consumer of molybdenum who obtains an export licence can now purchase all the molybdenum he wants.

Indian Cupola Experiments

An interesting series of experiments has been commenced at the foundries of Burn & Co., Howrah, Calcutta, to investigate the possibility of operating a basic cupola under Indian conditions, using domestic coke which normally has an ash content of between 20 and 30 per cent.—this ash also containing phosphorous compounds which result in a definite pick-up of this element under normal cupola melting conditions. A cupola has been adapted for water-cooling along with oxygen injection. A basic lining prepared *in situ* has been applied to a paint thickness on the water-cooling inserts, accompanied by full lining of the well, launder, ladles, etc., with basic material.

Preliminary results have exceeded expectations and although much development work remains, there is an indication that this process may ultimately solve one of India's major metallurgical problems, *i.e.*, production from Indian materials of a low-phosphorous, grey iron for specialized work or for subsequent processing.

Wolverhampton College Opening

As announced last week, the new premises of the National Foundry College were formally opened on February 3 by Sir Gilbert Flemming, Permanent Secretary to the Ministry of Education. Accompanied by the Mayor of Wolverhampton, (Alderman Mrs. A. A. Braybrook), the Bishop of Lichfield (Dr. A. S. Reeve), and the Director of Education for Wolverhampton (Mr. F. Lonsdale Mills), attended the opening which took place in the middle of a heavy snowstorm. The ceremony covered not only the buildings for the National Foundry College but also all the post-war extensions to the main Technical College itself. The new wing to house the College represents an expenditure of £90,000 for the site and buildings and a further £35,000 for equipment, of which the foundry industry has provided about £14,000 in value of equipment and money. Post-war extensions to the Technical College itself, which run back from Stafford Street towards the existing college buildings, have provided additional laboratories and workshops for the departments of electrical and production engineers. Still further accommodation is required for the engineering, science and domestic science departments, and in the final plan a theatre is to be provided for the music and drama activities of the Technical College and for local education authority requirements generally. Like the foundry college, the technical college has been fortunate in receiving the help and support of Midland industry. During the past two years it has received gifts to the value of about £12,000 in the way of engineering equipment and instruments.

Foundry Premises Opened

During the further opening ceremony later in the afternoon, Sir Gilbert Flemming said that while the opening of the new buildings marked an important stage, its importance was nothing like so great as the use that was going to be made of the new facilities. There was, he said, every reason to believe that the number of students would increase, and that the industry would be encouraged to give even stronger support, and would make even greater use of the facilities provided.

To students, he said: "You will realise that your success will depend on whether you have learned how to continue your education on the shop floor, always looking out for new methods, welcoming new ideas and keeping in touch with research and knowledge."

He asked employers to make sure they used trained students to their fullest capacity. It would pay to give those students "too much responsibility rather than too little."

Before the afternoon ceremony, over which Sir Percy H. Wilson, chairman of the Board of Governors of the National Foundry College, presided, the new buildings were open for inspection. Later, the headmaster of the Foundry College, Mr. H. Bamford, gave his annual report, and Sir Gilbert Flemming presented diplomas to students in the 1951-52 and 1952-53 sessions.

At a private dinner before the annual prize-giving ceremony, the Governors of the National Foundry College, Wolverhampton, entertained a number of guests, and Mr. P. H. Wilson, chairman of the Governors, presented a silver salver to Mr. F. Lonsdale Mills, the retiring director of Education for Wolverhampton, who has also been clerk to the Governors of the Foundry College.

Publications Received

American Arc-furnace Practice by W. B. Wallis. Issued by Birlec Limited, Tyburn Road, Erdington, Birmingham, 24.

This interesting paper was abstracted in our columns using those portions which touched upon foundry practice (October 22, 1953). The potentialities of large electric furnaces are so great that this reprint is worth studying by readers interested in the economics of steelmaking. It is available to readers on writing to Birmingham.

Size Analysis of Coke (B.S. 2074, 1954). Published by the British Standards Institution, 2, Park Street, London, W.1; price 6s. net.

This specification devotes much attention to sampling, for rightly, results emanating from a badly taken sample are positively misleading. Yet the methods set out are such that except for arbitration cases they are not practical for foundry control purposes. However, industry was wise to create such a standard for use by the largest users of coke.

Witton Works of the General Electric Company Limited. Issued from Magnet House, Kingsway, London, W.C.2.

This well-produced brochure contains a general description of the three main works at Witton, Birmingham, but dismisses their not inconsiderable foundries in three lines. Thereafter follows a series of captioned pictures, the first group of which show various departments (excluding the foundries) and the second great engineering projects to which Witton has made a major contribution.

Wellworthy of Lymington.

To commemorate their silver jubilee, Wellworthy Limited of Radial Works, Lymington, have issued a souvenir booklet. Spirally bound, well printed and splendidly illustrated, it indeed is an excellent example of current publicity. The inclusion of a decorative map is specially commended, but we deem the brochure to be marred somewhat by the page facing the introduction carrying what is *not*, but has every appearance of being, an advertisement. Being in heavier type, it detracts from the importance of the introduction. The great progress the firm has made, well merits the congratulations the reviewer offers. This progress is such that the firm now operate three factories.

Iron and Steel Trades in 1953. Published by William Jacks & Company, Limited, Winchester House, Old Broad Street, London, E.C.2.

One would have thought that this great merchant house, handling as it does extremely large quantities of foundry pig-iron, would in its annual review make some reference to the business of one of its important customers. However, the review adheres closely to the iron and steel trade, and unquestionably presents a masterly survey of its activites during the year lately drawn to a close. Of some interest to readers is the fact that imports of scrap materially increased in 1953. As the trading conditions of the foundry industry follow much the same pattern as that of iron and steel, the review can be studied profitably by readers.

THE FOURTH international conference on Electrodeposition and Metal Finishing will be held in London at the Holborn Restaurant on April 20-24, 1954. Non-members who are interested in receiving details should communicate with the conference secretary, Institute of Metal Finishing, 32, Great Ormond Street, London, W.C.1.

Setting Patterns on Patternplates

By J. Huggonson

A quick and quite accurate method of setting patterns on patternplates and matching plates is as detailed in the following step-by-step operations:—

A sheet of cardboard is cut to the size of the patternplate required, and two holes are punched out to take the pins of the plate, on which it is next laid flat. The half-patterns are then placed on the cardboard in any desired position (this does away with any elaborate setting out usually required). The profile of the patterns are carefully marked around with pencil, and then the shapes are cut out.

The patterns are placed in the cut-out shapes of the cardboard, and are fixed on to the plate. To set the other half-patterns on the corresponding patternplate, the cardboard template is lifted off the plate, reversed, and placed on the other plate, the half-patterns being placed in the cut-out shapes and fixed in position as before. An additional advantage found with this method (especially for metal plates) is that when the half-patterns are placed in the cut-out shapes of the cardboard, movement of the patterns on the plate is prevented when fixing.

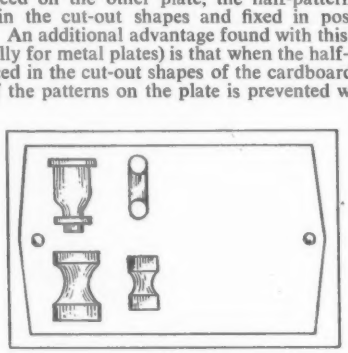

FIG. 1.—*(A) Cardboard template (white) placed on the patternplate (cross-hatched), with four patterns placed in the cut-out shapes, and (B) cardboard template reversed on the same patternplate. The rectangular hole is cut away to clear the patterns already in position, as shown in (A). The corresponding half-patterns are placed once more in the cut-out shapes.*

Where one patternplate serves for two or more patterns, only one half of the cardboard template is cut to the pattern shapes, the other being cut out to clear the patterns when the template is turned over (see Fig. 1 above). The method is very simple and does away with uncertainty and liability to the "human error," always present until the first castings are made off the plate. It also enables the youngest apprentice to set patterns of the most irregular shapes on a plate and know that without doubt the castings will not be off-set when cast.

C.F.A. Safety Conference

Ashorne Hill, March 1 to 3

With the object of improving accident-prevention work in iron foundries, the Council of Ironfoundry Associations recently established a safety committee on which nearly all sections of the industry are represented. One of the first tasks of this committee has been to arrange a "safety conference" to be held at Ashorne Hill, Leamington Spa, from March 1 to 3. In planning the conference, the committee has had two objects in mind: First, that firms should have the opportunity of learning from each other what is being done in foundries and of determining what further steps can be taken to reduce the number of accidents, and secondly that founders should learn from other industries how they have tackled their problems. The conference will include a small foundry safety exhibition and a film show. The programme which is detailed below gives full scope to achieve both objects.

Provisional Programme

Monday, March 1

3.0 p.m. onwards—Registration.

5.0 p.m.—Opening session; introductory remarks by the chairman, followed by "Iron and Steel Foundries Regulations, 1953: Their Relationship to Safety," by Sir George Barnett (H.M. Chief Inspector of Factories) and discussion.

8.0 p.m.—Foundry safety exhibition* and industrial safety film show.

Tuesday, March 2

9.0 a.m.—"Accident-prevention organization in industry," comprising three sections: (1) ". . . Steel Industry," by J. Wadsworth, director (Park Gate Iron & Steel Company, Limited); (2) ". . . Rubber Industry," by R. W. Lunn (Leyland & Birmingham Rubber Company, Limited); and (3) ". . . Ironfounding Industry"—two brief contributions by members of the C.F.A. safety committee.

10.45 a.m.—Interval, followed by discussion on the morning's Papers.

2.30 p.m.—"Work of the Foundry-atmospheres Committee of the British Cast Iron Research Association," by H. T. Angus, PH.D., M.SC., followed by a discussion.

5.0 p.m.—Discussion groups: subjects for consideration:—(1) Safety organization—what can the small foundry do?; (2) works safety propaganda and instruction; (3) protective equipment—how to make men use it; (4) good housekeeping as an aid to safety; (5) rôle of plant maintenance in accident prevention; and (6) control of foundry atmospheres.

8.0 p.m.—"Manual Lifting and Handling"—a talk and some practical demonstrations by Mr. George Hickling (Central Council of Physical Recreation).

Wednesday, March 3

9.0 a.m.—Discussion group reports.

10.0 a.m.—"Accident Prevention and Employers' Liability Insurance," by J. Anderson, accident-prevention department (Midland Employers' Mutual Assurance Company), followed by discussion.

11.45 a.m.—Close of conference.

Delegates of member-firms of the C.F.A. are invited to apply for admission to the conference, and all such applications should reach the secretary of the Council at 14, Pall Mall, London, S.W.1, not later than February 19.

* The exhibition will remain open throughout the conference.

Why Sand Control?*

By C. A. Sanders

A comprehensive Paper dealing with many phases of the introduction of sand control. "Necessity for," "application of," and "results to be expected from" provide the main themes. The notions put forward are applicable to both large and small foundries.

A very early metallurgist, the famous Berthier, insisted that better refractory materials be given him before he could make a more satisfactory refined iron in the ever-increasing metal industry. It was he who learned the importance of balancing ceramic materials to give satisfactory results in the foundry.

Darby, an English foundryman during the first half of the 18th century, supported present views of sand moulding technique. Whether his knowledge and methods were in use on the Continent, or in Holland, is uncertain, but Darby is recorded as having brought back from Holland certain techniques and skilled workmen to formulate ideas for the present technique of green- and dry-sand moulding. This is generally considered to have been the beginning of sand control.

Trial and Error

The present-day foundryman, because of the keenness of competition, finds it advantageous to utilize scientific information of every type that bears on foundry improvement. For this reason he has become an accomplished metallurgist but little authoritative information is available about moulding sands, as it is a subject relatively new to the foundry. Most current information has been gained by "trial-and-error" methods in the foundry. Yet sand mixtures and their behaviour are of vital importance to the production of quality castings. While the best sand condition cannot atone for metallurgical sins, bad sand conditions can nullify the benefits of good metallurgy.

Sand control is a method of eliminating many of the variables in the modern foundry. Its chief function is to supply a sand mixture of correct physical properties to make a particular casting and one which usually results in more economical methods of production because casting defects are minimized.

Economy

Because scientific sand control is a relatively new subject, many of its less obvious benefits are not yet recognized in the foundry. Closely controlled sand conditions produce savings in the cleaning department and in the machine shop, as well as in the foundry. For example, the author has seen many labour-hours eliminated at the shake-out when proper sand control directions were obeyed.

Many foundries do not treat sand control with the same degree of thoroughness employed in analysing the various metals poured. So little importance is placed on the sand laboratory that many sand testers lose interest in their jobs and hesitate to inform their superiors of incorrect physical properties. It is common to find a rapid turn-over of personnel in a sand laboratory, as most companies still continue to indoctrinate their chargehands or foremen in the laboratories before sending them to the production line. Training foremen in the laboratory is a good practice, but it is highly advisable to have at least one competent man working continuously in the sand laboratory.

Small Foundries

A number of smaller foundries have sand-testing equipment, but employ very little control. They usually state that their sand laboratory is operated in the summer months with the assistance of a high school lad, but during the long winter months they try to maintain standard physical properties without testing! When a foundry is in trouble, the aid of a consultant is sought. He begins by calling a conference and asks a number of fundamental questions. When he illustrates all the reasons and causes of the trouble, he is too often assured by the supervisors that all of these causes have been checked, and often the supervisors staunchly deny that those reasons are causing the defect. The explanation—he isn't getting the facts! To prove this, the consultant generally pays a visit to the laboratory and by inspecting the equipment, procedure and tools, he can usually determine whether or not the data that have been given him are correct. However, with all the tools and instruments that are available, it is sometimes impossible to find the cause. But, why not? There is no instrument that can measure the *human variable*!

Importance of Technicians

Frequently very good sand men with future promise do not want to stay in a laboratory for any length of time because it offers little authority, and they are strangled in this position. It is the author's opinion that the sand technician in every foundry should be placed on a par with the metallurgist, with the same amount of prestige and authority as this important department demands.

A jobbing shop requires the services of a sand technician more than a production shop because of the great variety of facing mixtures and numerous patterns. Where it is possible to evaluate the data furnished by foundry tests, it is quite easy to recommend the correct prescription for solving foundry problems.

* Exchange Paper from American Foundrymen's Society to the Institute of British Foundrymen, Australian (Victoria) branch. The Paper was read by Mr Harold Stevens, with Mr J. D. Ebeling presiding. The Author is vice-president, American Colloid Company, Chicago, U.S.A.

Why Sand Control?

A Problem

This brings attention to a problem that originated in a foundry some time ago, the Author being present during the discussion. The foundry was running into much difficulty due to moulding sand, and a certain foreman was asked his opinion. Being from the old school, he immediately advised the management to stand by and wait until the sand was in perfect balance and the difficulties would disappear. This is wrong When one is ill, one visits a doctor for medicine or treatment which will relieve these ills. No one expects him to say, "Go home and when you are in proper balance you will be well." It is realized that this would be true, but no one is willing to wait. Immediate action is wanted. A sand technician is the same as a physician; with proper instruments, he can determine where the defect originates. He is also able to furnish the correct prescription to restore proper balance in the moulding sand system quickly.

Responsibility

Many examples of good foundry sand practice can be illustrated in leading foundries. These foundries have found it essential for every good foundryman to know sand preparation before being allowed on the production line. Many foundry apprentices are asked to spend considerable time in studying the correlation of foundry sand practices with casting results.

The sand man should be responsible for sand and binder costs, all scrap due to sand conditions, and the condition of castings to be cleaned. Ordinarily, the efficiency of processing the castings in the machine shop is under the surveillance of the metallurgist, but surface defects on the castings that might impede machining should be charged to the moulding department and the sand technician's attention should be invited. All raw refractory materials should pass through the sand laboratory, and the sand technician should be in charge of the supervision and development of new uses of these materials.

When the metallurgist of a given plant is also responsible for testing sands, the competitive angle between metal and moulding sometimes defeats the purpose. Most metallurgists are schooled in metals, but their knowledge of refractories is somewhat limited. The jobs are equal in importance and must be competitive if blame is to be placed in the correct direction.

Are you a Magician?

If it were possible to become a "magician," and by flashing a wand in an office laboratory one could create or eliminate defects at will, the foundry would be "Utopia." Such conditions do not exist and it is only the information obtained from trials, investigations, and actual experience in the casting of metals in sand moulds that furnishes the decisions in the plant.

Some of the smaller foundries find numerous unrelated reasons for changing their moulding sand supply and do so at the "toss of a coin." Many reasons are given for the change, and regardless of the casting defect, the moulding sand gets it full share of the blame. The changing of moulding sand is not so serious if the decisions are arrived at systematically.

A wide variety of sand mixtures furnish such entirely different physical properties that the sand laboratory should be consulted on all changes in the source of supply. Usually the nearest and most available source of supply can be made to fit the job. By correctly blending sands with various bonding materials, suitable properties can be obtained. The problems of producing a good working sand mixture are many, but the satisfaction and results obtained are well worth the time and cost. Once this condition is satisfied, and the sand laboratory has produced the most economical sand mixture for the castings to be produced, standards should be established and they should be changed only after very careful consideration.

Variable Materials

All materials that are added to moulding sands vary somewhat from delivery to delivery, even with the utmost care given by the producers. Variation of each affects the other constitutents, and changes the moulding qualities of the mixture as well as affecting the quality of a finished casting. As a result, sand mixtures prepared in various ways for moulding vary in a number of important physical characteristics, such as: Green strength, dry strength, hot strength, flowability, permeability, refractoriness, deformation, toughness, expansion and contraction, and many others. These factors naturally affect the quality of the castings.

Moulds made from any given sand mixture may vary in mould hardness, surface smoothness, permeability, mechanical strength, strength of the mould at casting temperatures, density, etc. Some of these variables are controlled by the moulder to a greater or lesser degree; others must be controlled in selection and preparation of the mixture. All of them have an important bearing on casting qualities. With the demand for high production and better castings, it is necessary to eliminate as many variables as possible and concentrate on the effectiveness of better control.

Salesmanship

Establishing good sand control in the foundry is a difficult task and is mostly accomplished by the art of "good salesmanship" accompanied by satisfactory results. If a company grants the sand control laboratory the proper authority and prestige, the laboratory can then sell sand control to the foreman as a means of producing good results.

A first-class foundry sand technician must "sell" the idea of proper sand control to the moulders by supplying them with a sand mixture that is easy to ram. A good flowable sand which rams well and produces a mould surface of uniform texture, gives the moulder greater confidence in his work and encourages higher quality of craftsmanship. Sand mixtures that possess high flowability eliminate unnecessary "butting" and "tucking" and enable the moulder to make a few more moulds per day, which is more satisfying to the moulder.

Shedding Responsibility

Sand possessing a proper degree of workability strips from the pattern equipment with a smoother and more desirable surface finish. Moulds that are made from sand having good workability increase production and more castings are passed to the fettling shop. A sizeable foundry cannot afford to be without the service of proper equipment and material to produce sand of good workability.

Too often, the moulding department claims rejects of less than one per cent., but sends castings to the cleaning room which are difficult to fettle and cost many dollars to save by welding, grinding and patching with fillers. The responsibility for the extra cost should be fixed at a conference between the fettling shop and the moulding department.

The author has viewed too many castings with high machining costs which were caused by chilled metal or hard spots, in turn caused by poor sand conditions. To cite a case, one foundry with weak sand was employing a number of gagers and bars in the flasks. At the same time hard spots were produced in the metal because the gaggers were so close to the casting that they acted as chills. A sand technician could have saved this company many hundreds of dollars per year before the defect was discovered. .

Wastage of Sand

It is needless to mention that a good working sand mixture should be clean. It must be free from all contaminating material, which is best removed by proper sand conditioning, by magnetic separation and other mechanical devices. If a unit of this nature is not available, a smaller shop may add new and discard old sand to obtain the same effect, but the cost is greater.

Control in reclamation is a problem for the sand technician and since many shops still haul sand to the dump, it should be his decision as to how much of the refuse sand should be disposed. Many shops still insist on all-new sand mixtures for facings, while others use blends. The majority of foundries are re-using much of their system sand on production lines.

Commercial foundry sand laboratories have investigated moulding sands used by various foundries over a period of many years. It was found that 75 per cent. of the sands used in these foundries were not the best grade for the type of castings produced. Further, it was usually found that the sand had poor distribution and either was too coarse or too fine. Some of the foundries were notified that the sand was too fine, and they attempted to open it by additions of a coarser grained sand. This practice generally resulted in poorer rather than improved grain distribution. It is very easy for intermediate sand grains to "elbow" or crowd adjacent sand grains out of position. When sands are too coarse, castings show poor finish and result in metal penetration.

Bond Control

Bonding the sand properly is one of the most important factors in the production of good castings. The problem is to provide a bond that functions satisfactorily at all stages between room temperature and molten metal temperature. Each natural clay bond has its own individual properties. Some bonds are suitable for low temperature, but totally unsuitable for high temperature. They should be selected very carefully, depending upon the types of physical properties required in the sand. Most reliable clay and sand companies publish complete information regarding the type of bond and their services should be sought before any decision is made to solve the particular problem.

Core Shop Control

Control in the core room is just as important as control in the system sand, and the same principles apply although the binders may vary. Since the core room is part of the sand system, the sand laboratory should be given full control of all its activities.

The foundry technician has learned to use many old-time moulder's secret tools. If he wanted to make exceptionally hard cores, he added a small percentage of stale beer as temper water, and was able to produce a hard core. During the war years, the foundry sand technician found that he could get the same results by the addition of a small amount of soluble sugar solutions. Apparently the sediment, sugar and alcohol contained in the stale beer was the answer to the problem.

Years ago when the old moulder found that sections of large flat castings were buckling or showing rat tails, he usually went into the street and picked up a few shovels of horse manure to mix with the sand. To-day, the same effect is obtained by adding corn flour, wheat flour, wood flour or other cellulose binders to compensate for sand expansion.

Degree of Supervision

Foundries are abolishing volumetric measurements and most additions of various foundry materials are made by weight. All bonding agents added should be very carefully measured, and sand tests should be taken as often as necessary to establish complete control. Intermittent additions at the muller are not proper and result in irregular physical properties. The larger the sand unit, the more control is necessary, as the percentage of error increases greatly if correct control is not maintained.

Moisture control is essential if consistent results are to be established. Improper moisture conditions result in many defects, such as blows, scabs, dirt, rough finish, penetration, pin holes and innumerable others.

There are many ramifications of casting defects due to poor moulding equipment, improper gating, pouring, labour conditions, shifting of weights, or poor pattern equipment. The sand technician should not be self-opinionated but should be an information centre for the group. The door of his laboratory should always be open to any department seeking advice, rather than to supply advice when it is not requested. Department foremen soon learn the advantage of the sand laboratory,

Why Sand Control?

and will not hesitate to call upon the foundry sand laboratory for advice and information.

Larger Companies

Larger companies have found it quite advantageous to establish proper training, say once a week for all foremen and supervisors in charge of various departments. Supervisors have learned their instructions are not always carried out. They must follow up their own directives. They have found it takes leadership, and with leadership the leader himself must be able to do the job and do it correctly. This only comes with experience, training and education. A good foundry technician always defends his position and tries to point out his interpreted conclusions to an assembled group.

Most of the labourers in the foundry are men with some educational background, and it is easy for them to comprehend right from wrong. It is essential that leaders of departments know their jobs equally as well and, for example, are able to walk up to a squeeze-machine moulder and say, "This is the way it is done!" Why then do we not take advantage of a simple educational system?

Unwarranted comments have been made about foundry sand laboratories, to the effect that since duplication of results cannot be obtained, we are no closer to the answer than we were 10 years ago. As defence, why should a foundry sand laboratory at Chicago, Illinois, be interested in duplicating results with a foundry in Philadelphia, Pennsylvania? The purpose of the foundry sand laboratory is defeated when one tries to compare results from different sections of the country where so many climatic conditions and a variety of mechanical differences affect testing results. The foundry laboratory is established to control only the physical properties of that particular plant.

Production of Research Laboratory

A sand technician should try to discourage companies from using the sand laboratory as a research laboratory. There is a very strong difference between the two. Too many foundries seem to be concerned with research problems which can never be solved in a production laboratory. For example, there is a definite trend toward the measurement of the viscosity of various bonding clays and bentonites, also a trend toward the determination of the *p*H value of sand mixtures, the determination of the type of electrolytes to use in various sand mixtures to increase or decrease green compression strength, the precise control of heat, and the measurement of expansion and contraction. The author does not condemn these practices, but rather discourages them on the foundry floor laboratory. Since the Author has had an opportunity of studying bonding agents and the effect of wetting, electrolytes, heat, etc., upon them, he feels it would be ridiculous for the production laboratory to try to make an evaluation. There is a definite barrier between operational and technical data, and it is the sand technician's job to determine from which side raw materials should be purchased. Companies will profit by this information and will welcome a sand technician with "horse sense" as well as technical ability. Use the sand laboratory for practical production problems, and do the research at reputable research institutions! An up-to-date foundry is lost without a sand laboratory, for it can be made the nucleus of many problems occurring daily on the production line.

Conclusion

As progress continues in the study of present and future moulding materials and their inherent properties, one can and will be more proficient in supplying more suitable sand mixtures. Possibly the industry will never reach the stage of perfect sand that produces a perfect casting day-in and day-out, but the Author feels strongly that foundry technicians are reaching a stage of more intelligent thinking, and are reducing the percentages of error greatly by applying their knowledge of foundry sand control.

Thus, application of sand control is meant to produce better working sands, which should result in better quality castings. Is it so little to ask that the proper prestige, claim of responsibility, and evaluation be given to the control laboratory?

The Paper concludes with an extensive bibliography.

Shipbuilding Outlook

Reference to the absence of new orders for British shipyards, the cancellation of contracts, and the growing competition from foreign yards was made by Sir Frederick Rebbeck, chairman of Harland & Wolff, Limited, Belfast, when he spoke recently at the launch of the liner Iberia, built by the company for the P. & O. Line. Sir Frederick said that his company had plenty of work to do in 1954, but the outlook for the years ahead was not so satisfactory.

Foreign competition was growing, he declared. In the 24 years up to 1952 Harland & Wolff had the largest output in the world, but in that year it lost it to a Swedish firm. Last year two Swedish firms, two German firms, and one American firm had produced more. Repair orders had been withdrawn for the North-East Coast and placed with Continental firms, work being cheaper, quicker, and equally well done.

Iron-ore Project in Labrador

The Republic Steel Corporation, of Cleveland, Ohio, is looking to Labrador as a further source of iron ore for its mills. Transport in such a project is a vital factor. Mr. Thomas F. Patton, assistant president and first vice-president of the corporation, speaking at the launching of one of the ships that will carry the ore, said he had been happy to learn that the 357 miles of railway to the ore deposits from the St. Lawrence River had been completed.

The vessel, which was launched from the Govan yard of the Fairfield Shipbuilding & Engineering Company, Limited, is the Chateaugay and the third of six similar ships ordered by the Liberian Navigation Corporation. Her two sister ships, the Bomi Hills and the Enduro, carried half of about 1,000,000 tons of ore shipped from Liberia to Cleveland last year. The Chateaugay is scheduled to be in service carrying ore from Labrador in July.

Brussels B.I.R. Congress

[*From our Belgian Representative*]

The B.I.R. (*Bureau International de la Récupération*) is a comprehensive association grouping the national associations of eleven countries for the purpose of co-ordinating scrap reclamation. Created by five nations in 1948, the B.I.R. now includes: U.S.A.; Great Britain; France; Belgium; Netherlands; Sweden; Denmark; Western Germany; Switzerland; Italy; and Luxemburg. The various recovery activities represented by each national association of these eleven countries are grouped into separate sections in the B.I.R., namely, ferrous scrap, non-ferrous scrap, textile rags, waste paper, and miscellaneous. The B.I.R. general meeting nominates a directors' committee, and then for each section there are technical sub-committees who work out programmes of action and take decisions.

Congress Report

Each section of the B.I.R. handled its own business at the recent congress, of the organization in Brussels, and then a report on the conclusions of the congress was presented by the section presidents to the general assembly. For the metalliferous sections, abstracts from the reports are contained in what follows:—

Non-ferrous.

The most pressing problem in the non-ferrous scrap industry is the difficulty encountered in crossing customs barriers and to sell from country to country. Legislation is different in all the member-countries and the needs and also the sources of scrap are particular to each nation. Nevertheless, it has appeared to the specialists of the Brussels congress that the reciprocal liberation of the circulation of non-ferrous scrap within the countries members of the European Organization of Economic Co-operation O.E.C.E. could be of real interest to the European economy. Belgium has already put the problem to O.E.C.E., but it will certainly take some time before a solution is reached. The problem is well in hand, but given that every country admits the principle of complete liberation, their particular problems first must be solved individually. On this point, it can be said that the last meeting of the O.E.C.E. was distinctly encouraging. Apart from the B.I.R., which is grouping the sellers of non-ferrous scrap, an association of users has been formed which is also strongly in favour of the liberation of the movement of scrap. Another fact worth noting is that the B.I.R. is now a member of the consultative body of the O.E.C.E.

Ferrous Scrap.

As can be seen from the list of the members of the B.I.R., some countries are part of the C.E.C.A. (European Community for Iron and Coal), others not. As far as the European market is concerned (U.S.A. being the only non-European member), the situation is dominated by the C.E.C.A. whose decisions are decidedly of great importance on the orientation of the market. Actually, contacts are maintained between the scrap trade and the C.E.C.A. who are said to be re-studying completely problems of scrap. It is too early to forecast what will be the tendencies followed or what decisions can be taken. Nevertheless, sellers with users' associations are studying the problem and following step-by-step everything that is being done by the C.E.C.A. Sellers as well as users are strongly in favour of freeing of supplies and would like to see the C.E.C.A. precepts applied both in the spirit and letter. As to non-member countries of the C.E.C.A., discussions between the C.E.C.A. and the U.K., especially, are following their course to try and secure the United Kingdom's participation in this work.

Conclusions

In all the fields of waste material recovery, the desire both of the users and the sellers is to arrive at a completely free circulation of recovered materials. All the efforts of the B.I.R. are directed to that end in Europe, within the O.E.C.E., the C.E.C.A., and, indeed, the whole world.

An important result of the congress was the creation by its arbitration committee of an International Arbitration Court. This will comprise experts from all the countries who each year will send their nominations. The court will give advice in special cases of international importance. A higher authority, *Le Cour Arbitrale d'Appel*, will eventually review the decisions of the court. This system of arbitration has been conceived on the lines of the International Chamber of Commerce, but taking care of the special traditions and technical necessities of the trade.

If from the word *récuperation* there might be conveyed some derogatory meaning, a few figures will give an idea of the importance of the trade. The annual turnover of the B.I.R. member countries in non-ferrous scrap is 2 to 2.5 million metric tons; ferrous scrap 50 million metric tons (30 for U.S. only); and in textile materials 4 million metric tons. The annual quantities exchanged in a year in the whole world is 12 million metric tons of waste paper. It is said that in the non-ferrous industry, 40 to 60 per cent. scrap is regarded as a raw material varying with each country.

Inspired Leadership Needed

Sir Godfrey Ince, Permanent Secretary to the Ministry of Labour, said in Birmingham last month that recent events had given a jolt to Britain's system of industrial arbitration, but to suggest as had been done in some quarters, that it had been discredited, was wholly unjustified. Sir Godfrey was speaking on "Industrial Relations and Human Relations" at a meeting of the Institute of Personnel Management. In commerce and the professions, he said, a man could visualize a career that is going to lead somewhere, but in industry the door to individual advancement is not open to anything like the same extent. Large numbers of men were stagnant and remain stagnant. Industry should give much more attention to trying to provide a progressive career for an increasing number so that they have got something to strive for. If this could be achieved men would have a greater sense of purpose in their work.

There is still a lack of confidence in the motives of employers, Sir Godfrey went on. There is a lack of appreciation of the real purpose of industry and "an idea that the people who run industry are merely concerned with lining their own pockets." A fundamental problem of human relations was how to restore confidence on both sides. It required a reorientation of mind both among workers and employers and the main responsibility rested on management and the unions. Management must accept the responsibility of trying to bring about a changed attitude of mind among the workpeople. "Man is not only a human being but a spiritual being, capable of rising to great heights," Sir Godfrey concluded—"but only if he is provided with real leadership. The essence of good leadership is good example and management can set a good example only if it conforms to standards of conduct above criticism and beyond reproach."

Personal

MR. J. FORBES JONES has been appointed chairman of Torwood Foundry, Larbert (Stirlingshire), of Jones & Campbell, Limited, stovemakers, etc., in succession to the late Mr. J. C. Bruce Jones.

MR. E. HUNTER, F.I.M., has been appointed deputy managing director of Court Works, Limited, Madeley, Shropshire. Prior to taking this position, Mr. Hunter was in charge of the foundry and foundry equipment departments of the Incandescent Heat Company, Limited, of Smethwick.

MR. K. M. JOHNSTONE, managing director of Babcock & Wilcox of South Africa, Limited, is to retire from this position in July, but will remain a director of the company. His successor will be MR. J. S. WOOSLEY, assistant managing director, who was closely associated with the installation of boilers at the Electricity Supply Commission and Municipal power stations, and with the establishment of the group's £1,250,000 factory in Vereeniging.

SIR JOHN DUNCANSON has been elected a director of the Lancashire Steel Corporation, Limited. Sir John was Iron and Steel Controller from 1942 until 1945 and commercial and technical director of the British Iron and Steel Federation from 1945 to 1948. He is a director of the Commercial Bank of Scotland and a member of the Boards of a number of other companies. Sir John is also a director of the National Research Development Corporation and a member of the Institute of Engineers and Shipbuilders.

MR. T. A. MCKENNA, chairman of the Staveley Iron & Chemical Company, Limited, MR. M. R. NORMAN, and MR. A. E. PEAK have all resigned from the board of the company by arrangement with the Iron and Steel Holding and Realization Agency. The resignations follow the decision of the Staveley Coal & Iron Company last November not to negotiate for the purchase of the Staveley Iron & Chemical Company from the Holding and Realization Agency. Mr. McKenna is chairman of Staveley Coal & Iron, and Mr. Norman and Mr. Peak are both directors of the company.

CROMPTON PARKINSON, LIMITED, manufacturing electrical engineers, announces the appointment of Mr. MICHAEL PARKINSON as general manager of its Guiseley works. Mr. Parkinson, who is 26, recently visited the company's factories in Australia and South Africa. He will retain his position as assistant to the works director, north. Mr. Parkinson joined Crompton Parkinson, Limited, in 1950 as a trainee in the production and other engineering departments. In the following year he was a member of the company's productivity team to the United States. He was co-opted to the Board of executive directors in March of last year.

NO ONE WAS better qualified to address Sheffield Metallurgical Association on the work of the research and development department of the United Steel Companies, Limited, than MR. FRANK HENRY SANITER, the Association's new president. He has been director of research to the United Steel Companies since 1945, but the story starts nearly 20 years before that—when he graduated from the University of Sheffield with the degree of B.Eng. in mechanical engineering in 1926, joined Steel, Peech & Tozer, and was engaged in the development of alloy and special steels. He continued this work when, in 1930, the United Steel Companies decided to concentrate the manufacture of alloy and special steels at Samuel Fox & Company, Limited. Mr. Saniter now controls the work in the research department at the Swinden Laboratories, Rotherham.

Obituary

MR. FRANK BAGNALL, of Birmingham, who has died at the age of 70, was mill manager at the works of Accles and Pollock, Limited, Oldbury, which firm he served for 43 years before retiring in 1949.

MR. M. W. RONAYNE, manager of the zinc and iron-work departments of G. A. Harvey & Company (London), Limited, died suddenly at the end of last month. Mr. Ronayne, who joined the company in 1920, took a keen interest in the education of apprentices.

MR. JAMES WILSON WHITEHOUSE whose death is announced at the age of 65 was, in 1908, co-founder with his father and brothers of the Metal Products Company (Willenhall) Limited and of the Willenhall Metal Reclamation Company Limited of which he was a director. Readers may recall the notice of the death of his father, Mr. James Whitehouse senior, who died on January 6.

MR. FREDERICK HICKEY, who was assistant director of naval construction at the Admiralty from November, 1941, until his retirement in 1946, died on January 27 at the age of 67. He relinquished his position as warship production superintendent at Glasgow in 1939 to become deputy superintendent of contract work at the Admiralty, and early in 1941 he was appointed manager of the constructive department at Portsmouth.

THE DEATH OCCURRED at Wolverhampton on February 2 of Mr. Sydney George Butler, joint managing director of Joshua Bigwood and Son Limited. He was 59. Mr. Butler was chief planning engineer with the English Electric Company Limited before moving to Wolverhampton in 1936 as a director of Butro Jig and Engineering Company Limited, a subsidiary of Joshua Bigwood. He was also a director of two other subsidiaries, Traughber Filter Company Limited and International Unicalor Company Limited.

THE DEATH is announced of Mr. N. H. Miller, A.M.I.E.E., Assistant Liaison Officer of British Insulated Callender's Cables, Limited. He was 61 year old. After serving as a pupil with the Hove Electric Light Company, Mr. Miller then went to Siemens Brothers and was afterwards employed by English Electric Company at Stafford. He served in the Royal Engineers in the first world war and was mentioned in despatches. In 1920 he joined the British Insulated concern as assistant contracts engineer of the telephone and power cables department and in 1952 he was appointed assistant liaison officer and held this position until his death. Mr. Miller was a director of Panelec (Great Britain), Limited, M.S.S. Recording Company, Limited, Industrial Reels, Limited, and Bartles (Carn Brea), Limited.

MR. J. C. ARKLESS, a director and secretary of A. Reyrolle & Company, Limited, manufacturing electrical engineers, of Hebburn (Co. Durham), died on February 1. He had been in ill-health for some time. Mr. Arkless, who was 63, joined the company in 1904, three years after its establishment at Hebburn. He held successive appointments as chief accountant, assistant secretary, and secretary, and was appointed to the Board in 1949. He was also a director of the Parolle Electrical Plant Company, Limited, the Bushing Company, Limited, J. H. Holmes & Company, Limited, the Heaton Foundry Company, Limited, and North East Wires, Limited. Mr. Arkless was a governor of the Electrical Industries Benevolent Association and a past-chairman of the Advisory Committee of the northern counties area of the association.

News in Brief

ORDERS BOOKED by the Power Gas Corporation, Limited, for 1953 amounted to £6,250,000, which was slightly below the bookings in 1952.

THE SUMMER MEETING of the Institution of Mechanical Engineers will be held in the Netherlands from June 15 to 18 inclusive.

B.O. MORRIS LIMITED, of Briton Road, Coventry, have placed on the market a Morrisflex tipped-tool micro-finisher for the superlative finishing of single-point carbide-tipped tools.

A RECORD is said to have been established by two 2D2 locomotives of the French railways running between Paris and Eastern Spanish frontier when during July last year they averaged 1,630 kilometres per day (about 1,000 miles).

BECAUSE OF a trade recession, about 300 men employed in the machine-shop of Sheepbridge Stokes, Limited, Chesterfield, may have work for only a four-day week. However, no date has yet been fixed when short-time working will begin.

LORD HIVES, chairman and joint managing director of Rolls-Royce Limited, will be the guest of honour and chief speaker at a luncheon which will be held by the Gauge and Tool Makers' Association at the Savoy Hotel, London, on March 21.

MR. JOHN SCOTT, director and general manager of the Fullwood Foundry Company Limited, Motherwell, presented Mr. Wm. Ralph, moulder, with a wallet of notes on behalf of the firm, to mark his retirement after 38 years' service with the company.

IT IS ANNOUNCED that Derby Town Council will be asked to approve the spending of £50,000, to develop the site of Osmaston Park as an industrial trading estate. If this scheme is carried forward it should attract more trade and industry to the town.

WOLVERHAMPTON DIE CASTING COMPANY, LIMITED, announce an issue of a further £50,000 in 6 per cent. 10s. cumulative preference shares which has been placed at par, free of stamp, subject to permission to deal. Proceeds are to be used for the expansion of the business.

OVER 30 WORKERS at the lead-smelting plant of H. J. Enthoven and Sons, Limited, of South Darley, near Matlock, have been given notice, among the number are some skilled engineers. The reason given that the "utmost economies are essential in all branches of the metal industry." It is not expected any more reductions would be made in the future.

WHEN the Cronite Foundry Company Limited at Frome received the Urban Council's approval for the development of their existing premises for a period of ten years, it was stated that 28 men were employed at present and that the proposed extension—a single storey building at the rear of existing premises—would involve the employment of ten more.

THE AUTOMOBILE GEARBOX DIVISION of David Brown and Sons (Huddersfield), Limited, are at present engaged on fulfilling an order worth about £100,000, covering the supply of four-speed and five-speed commercial vehicle gear boxes, which has been placed by the Birmingham and Midland Motor Omnibus Company, Limited, the largest privately-owned coach operating concern in the world.

GROUP PROFITS of Fletcher, Houston & Company, Limited, ironfounders and engineers, of Tipton (Staffs), in the year to September 30, 1953, fell from £149,203 to £110,596. The year's trading presented many difficulties, says Mr. Walter West, chairman, sales turnover being 24 per cent. lower with "profit-making" 25 per cent. less. Net current assets improved by £10,464—from £126,143 to £136,607.

AN ALL-METAL alkaline battery weighing five tons, which has been made by Nife Batteries Limited, Redditch, for a new power station at Keadby, near Scunthorpe, is stated to be the biggest of its type ever manufactured. Capable of an output of 450 amps., it is to be used for emergency lighting, providing power for oil pumps, and for operating the switches controlling the station's production of current.

THE WHOLE of the shares of Kent Alloys, Limited, Rochester, have been acquired by Birfield Industries, Limited. The new directorate is Mr. Herbert E. Hill, chairman, Mr. V. C. Hanson and Mr. C. E. Lovelace, resident directors, and Mr. G. T. Hyslop, Mr. D. L. Roome, and Mr. W. Smithson, of the Phosphor Bronze Company, Limited, Birmingham, which is also a subsidiary of the group.

THE NEED for a national policy for major technical colleges was stressed by Mr. J. Wilson, principal of the Birmingham College of Technology when he spoke at the annual conferment of associateships at the College on February 3. Such a policy, he said, should include a technological award not inferior to, but different from, a university degree. This would be granted to the best "industry-based" students attending approved courses at the colleges.

SPEAKING at the annual dinner in Birmingham of the West Midlands division of the Motor Agents' Association, Mr. R. Gresham Cooke, director of the Society of Motor Manufacturers and Traders, said that the industry was aiming at the production of 1,000,000 units during this year. It hoped to export 50 per cent. of the cars produced. He stressed that the industry had to do all that was possible to eliminate hindrances to the sale of cars and commercial vehicles in this country.

MR. CHARLES NELSON of F. H. Lloyd and Company Limited, Wednesbury, led a deputation representing 20 Black Country firms, which made strong protests to the West Midlands Gas Consultative Council against the price of Mond gas. It was stated that unless the price of Mond gas was reduced, alternative methods of heating in industry would have to be found. The chairman of the Consultative Council told the deputation that the facts would be examined and the Gas Board would be asked to make a statement at a later date.

BRITISH OVERSEAS FAIRS, LIMITED, set up in October, 1953, by the Federation of British Industries to promote trade fairs abroad, announce their important first venture—a British Trade Fair to be held in Baghdad from October 25 to November 8. One million square feet of waste land is being transformed from a wilderness into the site for a modern commercial exhibition. Mr. D. A. Lamb has been appointed as exhibition organizer and Mr. W. H. Young as assistant organizer. Lord Dudley Gordon, is a director of the new organization.

A NEW DUST-SUPPRESSION device for use in steel foundries was demonstrated in Sheffield on January 27 by the British Steel Castings Research Association. The device was shown to members of the Industrial Health Committee of the British Steel Founders' Association. Not yet perfected, it is designed to extract the dust thrown up by swing-frame grinders. Two years of research work have been carried out at the station established by the Association at the Vulcan Road works, Sheffield, of Edgar Allen & Company Limited.

News in Brief

MR. ACHILLE BRIZON assumed office last month as president of the International Committee of Foundry Technical Associations. Mr. Brizon is a past-president of the *Association Technique de Fonderie* and a director of die-casting foundries both in France and England. The new vice-president is Mr. Yngne Granström, president of the foundry section of the Swedish Engineering Employers' Association. He is foundry manager to the Swedish General Electric Company [ASEA]. The 1956 international conference will be held in Germany.

THE F.E.18 ultrasonic panel of the British Welding Research Association is considering the need for a standard, single-hole, steel reference block for use in ultrasonic testing. Such blocks would need to be commercially available and should bear a mark showing that they are of approved design and quality. All firms and individuals interested in this project are asked to communicate with the secretary, the F.E.18 Committee, British Welding Research Association, Abington Hall, Abington, Cambridge, from whom further information may be obtained.

LONG-SERVICE AWARDS were presented to five employees of Qualcast Limited, Derby, by Mr. V. Jobson, chairman and managing director, at the Grey Iron Division party, at the King's Hall, Derby. Mr. T. Severn with 40 years' service in the foundry department was presented with a gold watch, and clocks to three foundrymen with 20 years' service each. Among those present were Mr. D. McMillan, Mr. J. R. Flemming (joint assistant managing directors), Mr. T. Cooper (sales director), Mr. H. Clarke (works manager), and Mr. M. Wardle (foundry manager).

THE GREATEST ever influx of American buyers to this country is promised on the occasion of the Scottish Industries Exhibition in September at Glasgow. Mr. R. A. Maclean, chairman of the exhibition, said that 80 per cent. of the American firms visited by Lord Bilsland and himself on their recent American tour on behalf of the exhibition had decided to send buyers. The tour covered 15,000 miles, and nowhere was the reception more enthusiastic than in Texas, he said. The buying power of that State was incredible, and if we could get our goods there Scottish exports would increase by leaps and bounds.

TO ASSIST the Department of Industrial Metallurgy, Birmingham University, in the introduction of a course in precision casting, the Birmingham Small Arms Precision Casting Foundry, Redditch, has presented the department with a small indirect-arc electric melting furnace which can be used by students to melt steel for casting into sand moulds. Dr. V. Kondic, of the Department of Industrial Metallurgy received the gift from the company and discussed the furnace with Mr. A. C. Deacon, assistant works manager, and Mr. G. F. Waters, chief technical engineer of the department's laboratory was also present.

AT THE ANNUAL DINNER, on February 19, of the Staffordshire Iron and Steel Institute in Wolverhampton, the guests are expected to include Mr. A. G. Stewart, chairman of Stewart and Lloyds Limited, and president-elect of the British Iron and Steel Federation; Sir John Maud, Permanent Under Secretary, Ministry of Fuel and Power; and Mr. F. H. Lloyd, chairman and managing director of F. H. Lloyd and Company Limited, Darlaston, and vice-chairman of the British Steel Founders' Association. Canon A. P. Shepherd, Archdeacon Emeritus of Dudley and a Canon of Worcester will also be present.

MR. E. SCHLEUSENER, works manager, Mueller Brass Company, 1935, Lapeer Avenue, Port Huron, Michigan, U.S.A., wishes to receive details of casting equipment, and machines for compressing brass chippings into briquettes. Interested manufacturers are advised to communicate with Mr. Schleusener at the above address, and are requested at the same time to forward a copy of their correspondence to the British Consulate, 1259, Guardian Building, Detroit 26, Michigan, and also to inform the Board of Trade, Export Services Branch, Theobalds Road, London, W.C.1 (reference ESB/1623/54) of any action taken.

THE BRITISH DELEGATION to the International Management Congress, to be held in Brazil, from February 19-24, will be led by Mr. F. C. Hooper, vice-chairman of the British Institute of Management. Other British delegates include Mr. F. J. H. Coleman, staff controller of Joseph Lucas, Limited, Mr. L. O. Russell, director of the B.I.M., and Mr. John Ryan, vice-chairman of the Metal Box Company, Limited. They will be joined in Brazil by another 34 representatives of 24 British firms operating there, bringing the total British delegation up to 43.

A NEW FILM entitled "The TOCCO Story" has recently been received from the U.S.A. by the Electric Furnace Company, Limited. It is a 16-mm. sound film in colour, and gives a most interesting pictorial survey of the high-frequency induction heating processes and products of the TOCCO Division of the Ohio Crankshaft Company of Cleveland, Ohio. The film, the running time of which is 32 minutes, may be borrowed free of charge, by technical societies, schools and universities, and industrial concerns interested in high-frequency heating. Applications should be made at least 14 days before the intended date of showing, to Electric Furnace Company, Limited, Netherby, 161, Queens Road, Weybridge, Surrey.

OF THE TOTAL of 1,746 disputes in industry in 1953, according to the *Ministry of Labour Gazette*, most were of short duration, but accounted for about one-fifth of the total of 2,169,000 working days lost in the year. Nearly half of this time lost was in the 24-hr. stoppage of engineering and shipyard workers on December 2. In 1952, there were 1,714 disputes involving the loss of 1,790,000 working days. Last year weekly wages rose by about 3 per cent., compared with 6 per cent. in 1952, affecting about 9,000,000 workers. These increases amounted to nearly £2,400,000 at the end of 1953, and it is pointed out that a number of important claims remained outstanding at the the turn of the year.

SIR ERNEST CANNING, speaking at the annual dinner of the West Midlands branch of the Institute of Export in Birmingham, said he deprecated proposals by which groups of small firms would combine to send abroad one man to represent their various export interests, and expressed the opinion that it was impossible to match any individual representing several companies with "the old-fashioned export merchants." Outlining his own personal scheme of exports, Sir Ernest said: "First I would like to export for a time some of those intellectuals who, so far as I know, have never earned a 'bob' by honest labour in their lives and who have no idea of the difficulties with which managers have to deal." Mr. W. T. Downes, a vice-president of the Institute said that the experience gained by members in the export field was available to anyone whether they were or were not members of the Institute.

Imports and Exports of Iron and Steel in December

The following tables, based on Board of Trade returns, give figures of imports and exports or iron and steel in December. Figures for the same month in 1952 are given for the purpose of comparison, and totals for 1952 and 1953 are also included. (All figures are in tons.)

Total Exports of Iron and Steel

Destination.	Month ended December 31.		Year ended December 31.	
	1952.	1953.	1952.	1953.
Channel Islands	705	708	7,055	7,151
Gibraltar	122	65	1,705	1,547
Malta and Gozo	308	375	2,388	4,468
Cyprus	823	1,242	7,427	10,541
Sierra Leone	364	1,401	4,981	10,368
Gold Coast	3,118	3,085	39,223	42,163
Nigeria	4,103	7,588	50,178	70,647
Union of South Africa	12,364	4,097	136,752	103,116
Northern Rhodesia	1,942	769	29,288	20,470
Southern Rhodesia	3,236	5,108	53,507	70,348
Tanganyika	3,245	1,201	23,614	18,298
Kenya	6,738	7,422	49,106	87,890
Uganda	836	870	7,643	11,806
Mauritius	679	893	6,460	8,816
Bahrein, Qatar, and Trucial Oman	1,733	2,321	20,100	30,761
Kuwait	2,003	1,755	16,729	26,064
India	8,845	8,279	77,814	88,689
Pakistan	6,290	5,357	66,745	41,132
Malaya	6,643	6,993	79,096	73,983
Ceylon	2,837	4,095	23,238	27,461
North Borneo	419	1,248	3,848	8,039
Hongkong	2,490	2,193	27,100	29,267
Australia	23,186	21,175	297,299	179,008
New Zealand	13,764	16,211	150,658	130,310
Canada	9,262	13,861	185,138	211,647
Jamaica	2,683	2,126	27,893	20,817
Trinidad	5,957	5,416	48,826	45,630
British Guiana	471	768	5,717	6,660
Anglo-Egyptian Sudan	1,932	3,894	20,155	28,910
Other Commonwealth	3,503	4,703	38,689	70,007
Eire	5,935	5,378	66,464	61,622
Soviet Union	1	—	2,042	1,012
Finland	4,286	2,052	51,275	29,401
Sweden	8,459	11,631	112,749	90,381
Norway	5,591	9,189	64,602	85,107
Iceland	428	256	3,103	4,152
Denmark	7,321	7,542	75,828	101,510
Poland	77	55	251	883
Western Germany	401	83	2,104	6,706
Netherlands	12,728	8,957	111,629	140,606
Belgium	1,749	1,340	10,157	25,394
France	656	1,129	5,109	13,374
Switzerland	1,602	728	10,616	12,575
Portugal	1,314	1,567	10,415	16,944
Spain	581	428	9,199	5,998
Italy	4,033	6,639	22,892	68,493
Austria	43	52	596	1,484
Yugoslavia	126	2,204	4,524	8,861
Greece	666	676	3,863	16,036
Turkey	1,201	1,139	9,498	15,082
Netherlands Antilles	474	1,576	15,371	12,725
Belgian Congo	245	296	3,037	3,185
Angola	629	93	4,491	7,104
Portuguese E. Africa	778	291	5,070	3,269
Canary Islands	10	72	696	568
Syria	113	89	2,070	2,868
Lebanon	309	202	9,807	4,848
Israel	1,602	1,052	15,467	10,467
Egypt	4,550	3,540	37,136	29,409
Saudi Arabia	457	393	7,237	5,492
Iraq	4,101	4,571	50,808	81,424
Iran	569	220	9,828	3,399
Burma	1,459	2,296	12,673	24,483
Thailand	1,194	1,922	13,425	11,926
Indonesia	1,736	1,178	16,721	16,050
China	23	357	313	1,060
Philippine Republic	661	628	5,247	4,702
U.S.A.	2,165	2,984	46,488	94,600
Cuba	132	102	2,182	3,260
Colombia	1,133	2,284	5,398	12,086
Venezuela	3,779	5,943	49,573	49,292
Ecuador	270	147	4,023	2,544
Peru	984	371	8,750	9,925
Chile	765	239	3,747	3,174
Brazil	759	3	20,348	2,151
Uruguay	120	1,200	4,164	6,808
Argentina	2,366	2,874	35,299	14,473
Other foreign	1,210	2,125	24,032	26,430
TOTAL	220 392	233,312	2.498.689	2.6393,57

Total Imports of Iron and Steel

From	Month ended December 31.		Year ended December 31.	
	1952.	1953.	1952.	1953.
India	—	—	531	173
Canada	16,798	881	177,747	67,815
Other Commonwealth countries and Eire	8,678	2,311	18,691	181,807
Sweden	1,945	4,204	29,095	32,899
Norway	3,235	4,757	62,750	54,944
Western Germany	3,358	844	105,582	39,240
Netherlands	10,708	4,486	158,398	97,904
Belgium	33,201	12,315	310,646	198,765
Luxembourg	16,172	6,904	185,098	101,511
France	39,105	10,206	343,440	237,472
Italy	4,092	2	13,539	36,946
Austria	26,376	24,008	253,008	444,682
Japan	11,080	—	199,001	56,636
U.S.A.	34,043	8,528	576,041	126,722
Other foreign countries	6,470	39	23,014	41,994
TOTAL	215,261	79,485	2,456,581	1,719,510
Iron and steel scrap and waste, fit only for the recovery of metal	85,396	75,002	728,386	862,311

Exports of Iron and Steel by Product

Product.	Month ended December 31.		Year ended December 31.	
	1952.	1953.	1952.	1953.
Pig-iron	758	667	4,725	6,385
Ferro-tungsten	—	7	96	133
Other ferro-alloys	265	208	3,230	2,546
Ingots, blooms, billets, and slabs	15	309	245	1,781
Iron bars and rods	245	156	3,321	1,857
Wire rods	454	3,519	1,656	22,005
Bright steel bars	1,841	2,511	16,933	18,776
Alloy steel bars and rods	1,591	1,257	16,097	15,550
Other steel bars and rods	9,192	10,958	117,070	101,060
Angles, shapes, and sections	10,285	7,603	126,603	109,801
Iron and other castings and forgings	587	2,302	11,161	17,291
Girders, beams, joists, and pillars (rolled)	1,256	1,553	32,688	19,189
Hoop and strip	3,915	9,032	54,937	94,848
Iron plates and sheets	3	103	387	438
Tinplate	31,625	22,738	300,685	258,965
Tinned sheets	147	207	2,098	1,736
Terneplate and decorated tinplate	5	109	755	1,185
Other steel plate (⅛ in. thick and over)	20,167	17,213	239,711	226,299
Galvanized sheets	8,449	17,024	68,266	131,041
Black sheets	19,532	18,043	148,420	200,386
Other coated plates and sheets	1,411	874	11,767	9,779
Cast-iron pipes up to 6 in. dia.	6,556	5,475	86,523	78,988
Do., over 6 in. dia.	6,428	5,374	67,922	67,931
Wrought-iron tubes	31,919	39,549	423,724	442,769
Railway material	17,589	17,554	204,319	241,410
Wire	4,372	4,491	51,579	55,576
Cable and rope	3,079	1,810	31,331	29,358
Wire nails, etc.	1,542	887	16,343	19,097
Other nails, tacks, etc.	420	313	5,538	4,392
Rivets and washers	733	300	6,935	4,382
Wood screws	393	131	3,894	2,044
Bolts, nuts, and metal screws	1,644	1,708	22,255	19,765
Baths	427	459	11,469	4,350
Anchors	765	817	9,628	9,821
Chains, etc.	653	843	9,991	9,154
Springs	436	429	5,439	4,885
Holloware	8,274	12,664	92,145	117,006
Doors and windows	1,825	1,258	21,308	17,747
TOTAL, including other manufactures not listed above	220,392	233,312	2,498,689	2,639,357

Raw Material Markets

Iron and Steel

The light foundry trade has improved considerably since last autumn and many of them are now working full time coping with the demands for castings for heating apparatus, builders' castings, etc. Until the present cold spell the demand for builders' castings had assumed considerable proportions, because of building activities, and with the relaxation of restrictions there should be continued improvement in this direction.

At the moment, no difficulties are being experienced by the foundries in securing the necessary high-phosphorus pig-iron, but, contrary to the position a few months back, the makers are putting very little into stock, as the demand now almost balances the output. The heavy engineering, motor-trade, and speciality foundries are busy and at times it is difficult to cope with their demands for medium- and low-phosphorus iron and hematite, particularly when the requirements are for high-silicon pig-iron, of which there is now a definite shortage. Should trade at these foundries improve still further there is a possibility of a considerable stringency in a few months' time. It is understood that supplies of imported hematite will still come through, largely for the ingot-mould makers. At one time, it was thought that these imports would stop, but if they did it would put the whole trade in difficulties at once.

Makers of refined iron are busier, but would welcome additional orders.

Supplies of coke are coming through reasonably well and up to the scheduled tonnages, and in recent weeks there has not been quite so much difficulty in securing supplies of suitable scrap for the foundry industry. Limestone, ganister, and firebricks can be had with reasonable notice—there is no bottleneck in this direction.

Re-rollers are short of orders for light steel angles and bars and there does not appear to be any immediate prospect of the situation altering. This being so, their demand for billets is spasmodic, as they have fair stocks and also appreciate the fact that new orders can be executed within a reasonable period.

New business for heavy sections and joists is still coming in very slowly, although inquiries have increased recently. Demand for steel plates and sheets is in excess of present production.

Non-ferrous Metals

With the exception of lead, which lost ground rather heavily, metals last week put up a pretty good show, copper registering quite a reasonable advance. While it may be true that many commodities have been losing ground, and, indeed, metals have also joined in this trend, there is in many directions resistance to the fall, which suggests that demand is, on the whole, maintained at a good level. True there is labour unrest both at home and abroad, and last week trading on the Metal Exchange opened under the shadow of a strike at the Wankie Colliery from which the Rhodesian copper belt draws practically all of its coal. It is true that wood is also burned in large quantities, but coal is obviously necessary for smelting ore and is the most important fuel used at the mines. Some 9,000 workers were involved in this strike which was fortunately settled over the weekend, although it has been stated that production of coal will be below normal for some time to come. In the light of the obvious threat to copper output in Northern Rhodesia, the market last week was firm and closed on Friday afternoon at £228 for cash and £214 three months. This was some £4 better than a week earlier, but the backwardation widened to £14.

Of the other metals, tin was steady at a £2 advance in cash and £5 in three months, the backwardation narrowing slightly to £17. World production of tin last year has been reported at 181,000 tons, an increase of 13,000 tons on 1952. World stocks have been rising and at October 31 last were reported to be standing at 95,800 tons. Lead recovered sharply on Friday after a somewhat depressing week when values drifted steadily downwards, the net loss in the February quotation being about £2 5s. At the close the backwardation had narrowed to 5s., February standing at £82 15s. and May at £82 10s. Zinc picked up, too, on Friday afternoon, and in consequence the changes in value on the week were upwards, February gaining 5s. and May 10s.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* February 4, £225 10s. to £226 10s.; February 5, £227 to £227 10s.; February 8, £228 10s. to £229 10s.; February 9, £228 10s. to £229; February 10, £226 10s. to £227 10s.

Three Months: February 4, £212 10s. to £213; February 5, £213 to £214; February 8, £214 to £214 10s.; February 9, £213 10s. to £214; February 10, £212 10s. to £213.

TIN, Standard—*Cash:* February 4, £650 to £652 10s.; February 5, £647 10s. to £650; February 8, £652 10s. to £657 10s.; February 9, £655 to £660; February 10, £650 to £655.

Three Months: February 4, £630 to £632 10s.; February 5, £630 to £635; February 8, £632 10s. to £635; February 9, £635 to £636; February 10, £631 to £632 10s.

ZINC—*February:* February 4, £71 15s. to £72; February 5, £72 to £72 5s.; February 8, £73 5s. to £73 15s.; February 9, £74 to £74 5s.; February 10, £72 15s. to £73 5s.

May: February 4, £70 5s. to £70 10s.; February 5, £70 12s. 6d. to £70 17s. 6d.; February 8, £71 15s. to £72; February 9, £72 to £72 2s. 6d.; February 10, £70 17s. 6d. to £71.

LEAD—*February:* February 4, £81 10s. to £81 15s.; February 5, £82 to £82 5s.; February 8, £82 15s. to £83; February 9, £82 10s. to £82 15s.; February 10, £82 10s. to £82 15s.

May: February 4, £81 5s. to £81 15s.; February 5, £81 10s. to £82; February 8, £82 to £82 10s.; February 9, £81 10s. to £81 15s.; February 10, £81 10s. to £82.

Iron and Steel Scrap Order*

After consulting the Iron and Steel Board, the Minister of Supply (Mr. Duncan Sandys) has made an order affecting the acquisition and certain prices of iron and steel scrap. The order limits the need for a licence to acquire iron and steel scrap to persons engaged in: (*a*) The smelting of iron ore in a blast furnace with other metalliferous materials or the production of iron by any other process; (*b*) the production of steel by any process, and (*c*) the casting of iron or steel by any process.

The Order also removes tungsten-steel scrap from price control and amends the instruction for calculating maximum prices where delivery is effected otherwise than by the British Transport Commission or licensed road hauliers.

* The Order, the Iron and Steel Scrap (Amendment No. 2) Order, 1954, S.I. 1954 No. 50, came into operation last month, and is on sale at H.M. Stationery Office.